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SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

1988 FIVE YEAR PLAN

[Short Range Transit Plan]

[July 1988 - June 1993]

DOCUMENTS DEPT.

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A PLAN

FOR PROGRESS

MAY 23, 1988

BART FACTS
CALENDAR YEAR 1987 DATA

FIXED FACILITIES

Mainline Track: Revenue service is provided over 71.5 miles of double mainline 66 inch guage track, of which approximately 20 miles are in subway, 24 elevated, and 27 at grade.

Stations: There are 34 stations including 14 in subway, 13 elevated, and 7 at grade. Average station spacing is between 1/2 to 1 mile within and adjacent to San Francisco, Oakland, and Berkeley downtown areas, and 2 to 4 miles apart in suburban areas. Automatic fare collection equipment is located in each station to vend and process patron tickets. As of December 1987, BART provides 24,998 free paved parking spaces at 23 stations and 190 paved spaces at one additional station at a daily charge of 25¢ per space.

Maintenance Facilities: Equipment maintenance is performed at three Eastbay yards located in Hayward, Concord, and Richmond. A special track geometric vehicle is used to analyze the running rails and electrical third rail. Maintenance of right-of-way is routinely performed during off-revenue hours.

Administrative/Central Control Center: Trains are automatically controlled by wayside equipment and supervised by the central computer at BART headquarters located above the Lake Merritt Station in Oakland. Operators on board the leading car of each train have full voice communication with central control personnel and passengers on board, and can override automatic controls should the need arise.

ROLLING STOCK

Fleet Inventory: BART owns three types of revenue vehicles. Control equipped A-cars contain 72 seats, are 75 feet long by 10.5 feet wide, and can only be used as a lead or trail vehicle on each train. Non-control equipped B-cars also contain 72 seats, are 70 feet by 10.5 feet, and can only be used as a mid-train vehicle. Control equipped C-cars contain 64 seats, are 70 feet by 10.5 feet, and can be used as a lead, mid-train, or trail vehicle. As of December 1987, BART owns 137 A-cars, 303 B-cars, and 3 C-cars. All of these vehicles are in the operating fleet except for one A-car which is retained as an engineering test vehicle.

Trains: Train lengths range from 3 to 10 cars. Corresponding seating capacity is between 192 and 720 passengers. Scheduled top speed is 70 mph with a systemwide average of 33 mph, including station stops. Trains stop at each station along a designated route.

SERVICE HOURS

Rail: Rail service is provided between the hours of 5 am and 1:30 am Monday through Friday, 6 am to 1:30 am on Saturdays, and 9 am to 1:30 am on Sundays and major holidays. Closings for individual stations are timed with the schedule for the last train beginning at approximately midnight. Service frequencies (in minutes) for individual routes and line segments are as follows:

	TRANSBAY ROUTES			EASTBAY	CBD LINE SEGMENT	
	Concord-Daly City	Fremont-Daly City	Richmond-Daly City	Richmond-Fremont	San Francisco	Downtown Oakland
WEEKDAY						
Peak Hour	7.5	11	15	15	3.8**	3.8
Midday	15	15	15	15	5	5
Night	20	*	*	20	20	10
SATURDAY						
Daytime	20	20	20	20	6.7	6.7
Night	20	*	*	20	20	10
SUNDAY/HOLIDAY						
All Day	20	*	*	20	20	10

*Requires transfer between Concord/Daly City and Richmond/Fremont routes.
**3.0 minute headway service is operated during peak 15 minutes.

Express Bus: The District also provides express bus service within major travel corridors not served by rail in both Alameda and Contra Costa counties in the Eastbay. Bus service frequencies (in minutes) are as follows:

	Eastern Contra Costa	Western Contra Costa	Central Contra Costa-Alameda	Eastern Alameda
WEEKDAY				
Peak Hour	15	30	30	30
Midday	30	30	30	30
Night	60	60	60	60
SATURDAY				
Daytime	60	30	45	30
Night	60	60	60	60
SUNDAY/HOLIDAY				
All day	60	*	60	60

*No service during this time period.

(Continued on inside back cover)

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Draft Document

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

1988 FIVE YEAR PLAN

A PLAN FOR PROGRESS

The preparation of this report has been financed in part through a grant from the United States Department of Transportation, Urban Mass Transportation Administration under the Urban Mass Transportation Act of 1964, as amended, as passed through the Metropolitan Transportation Commission.

The contents of this report reflect the views of BART, which is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the original views or policy of the U.S. Department of Transportation. This report does not constitute a standard, specification, or regulation.

May 23, 1988

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

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LIST OF ACRONYMS

AC TRANSIT: Alameda-Contra Costa Transit

AFC: Automatic Fare Collection

BART: Bay Area Rapid Transit

CCCTA: Central Contra Costa Transit Authority

CIP: Capital Improvement Program

CPI: Consumer Price Index

CPUC: California Public Utilities Commission

MTC: Metropolitan Transportation Commission

RTA: Regional Transit Authority

SAMTRANS: San Mateo Transit

SF MUNI or MUNI: San Francisco Municipal Railway

STA: State Transit Assistance

TDA: Transportation Development Act

UMTA: Urban Mass Transit Administration

INTRODUCTION:

ELEMENTS OF ACTION

- A Plan For Progress
- Response To Challenge
- The Organization And Its Policy
- The Plan. . .An Overview
- A Special Note

INTRODUCTION REFERENCE GUIDE

ELEMENTS OF ACTION

HIGHLIGHTS

- BART's blueprint for progress is its annually updated Five Year Plan which is used to guide the organization in accordance with its policy.
- BART policy consists of linked elements: mission statement, goals, program objectives, and performance indicators.
- Each policy element is reviewed and updated annually as part of the planning and budget process, providing a guide for the organization in a manner which promotes efficient and effective service.
- The mission statement and goals are the broadest base policy elements.
- Program objectives support the mission statement and goals, and consist of projects or activities targeted for completion by specific dates.
- Performance indicators are measures used to gauge the state of the organization on an ongoing basis and reflect how well BART carries out its mission by working toward fulfilling its goals.
- The highest level performance indicators, those which best reflect overall performance, are designated as key indicators.
- BART's performance indicators are divided into three groups: service demand, service delivery, and productivity and efficiency.
- The chapters in this Five Year Plan follow BART's performance indicator classification: the first, BART's customers; the second, aspects of service; and the third, the organization's productivity.
- The fourth chapter presents BART's five year financial plan for operations and capital improvements.

REFERENCE DOCUMENTS

- San Francisco Bay Area Rapid Transit District Act, Second Edition (January 1, 1977).
- BART Quarterly Performance Report on System Objectives.
- BART Monthly Budget Performance Report.
- BART Quarterly Project Status Report.

A PLAN FOR PROGRESS

Progress is not a product of sponteneity. Progress requires work. Work that is backed by well thought out ideas put together in a way which can bring results. The blueprint for progress is a plan: a tool used for putting ideas into action. BART's blueprint for progress is its Five Year Plan, a document which is updated each year in response to changing conditions and new ideas.

BART, along with other public transit operators in the United States, submits its Five Year Plan to the Federal government's Urban Mass Transportation Administration (UMTA) via appropriate local government agencies. For BART, this agency is the Metropolitan Transportation Commission (MTC), the Bay Area's transportation planning organization through which public transit funding is allocated. At this level, the Five Year Plan serves the vital role of supporting BART's grant applications. It presents BART's case for funding of operations and capital projects in terms of ridership, service, efficiency, and productivity.

The purpose of BART's Five Year Plan is therefore to:

- Present a strategy for progress.
- Support BART's grant applications.
- Provide a sense of mission shared by all BART employees.

RESPONSE TO CHALLENGE

The first formal challenge for BART presented itself in 1957 when the State Legislature created the District in response to Bay Area growth and projected transportation needs. Efforts during the first five years focused on establishing the organization for the purpose of fulfilling the BART District charter which calls for the construction, operation, and maintenance of a rapid transit system in the Bay Area. The 1962 voter approval of a $792 million general obligation bond issue in San Francisco, Alameda, and Contra Costa counties provided the initial funding base and authorization to begin construction of the 71.5 mile system: the first new rail transit system to be built in the United States in over 60 years and the first rail system to make large-scale use of computer technology.

The newness of the technology resulted in a variety of unanticipated problems following the start of revenue service in September 1972. Accordingly, the challenge of the 1970s centered on improving BART's reliability. That challenge was met during the course of the decade, along with increased ridership. BART's focus of attention shifted in the early 1980s toward meeting the challenge of providing more frequent service and greater capacity. BART's Capacity Expansion Program was born out of this need and has already yielded results beginning in late 1986 when two new trains were added to BART's peak period schedule. This is the first of five new service increments under this program, the remaining four of which are to be phased in over the next two years. This transition presents a new challenge to BART, one which will require action this fiscal year.

BART's Five Year Plan speaks to this concern as well as to other important programs which help BART deliver safe, efficient, and economical transportation.

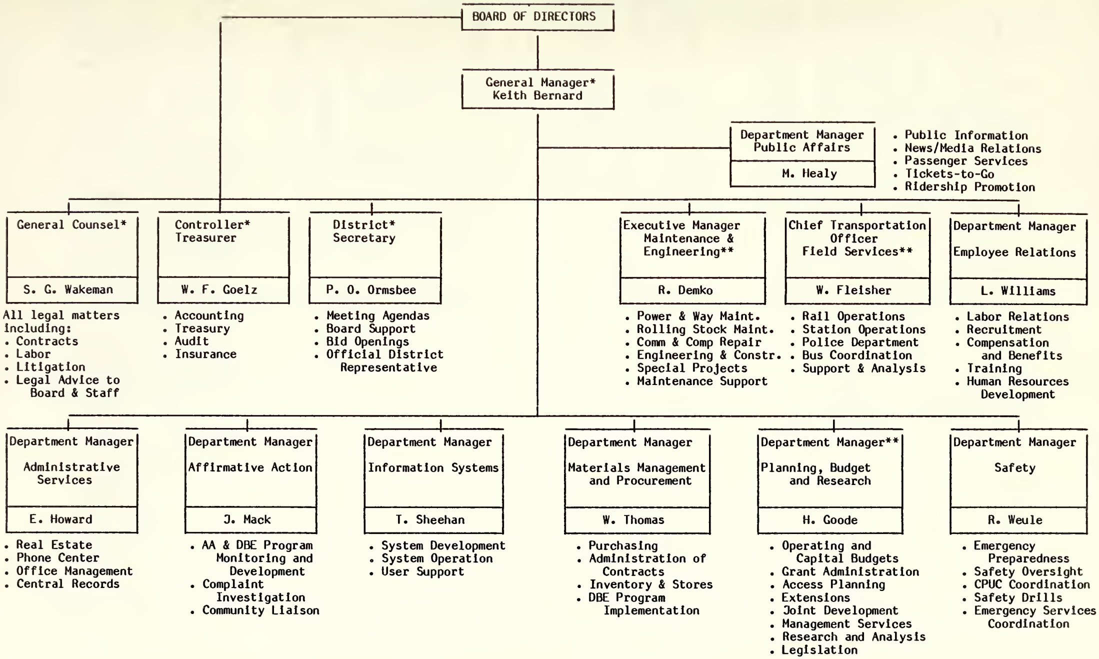
THE ORGANIZATION AND ITS POLICY

The organization of BART reflects a management structure which has evolved to effectively carry out its programs and policies. Thirteen department managers report directly to the General Manager who in turn reports to a nine-member elected Board. As Board appointed officers, three of the department managers also report directly to the Board of Directors. These are the General Counsel, Controller/Treasurer, and District Secretary.

Decisions regarding programs, projects, and budget matters are based on a thorough evaluation by BART staff which may involve outside consultant participation. Reporting of findings and recommendations is accomplished through appropriate Board Committees (ie: Administration; Engineering and Operations; and Public Affairs, Access, and Legislation). Committee recommendations are then brought forward for the consideration of the full Board.

Figure 1

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT



* Board Appointee
**Project Review Board

May 1988

As the legislative body of the District, the Board of Directors establishes BART policy. At its broadest level, this policy consists of BART's mission statement, goals, program objectives, and performance indicators. Each of these elements is reviewed and updated as part of BART's annual planning and budget cycle. BART's Quarterly Performance Report and Monthly Budget Performance Report are key documents used to evaluate the state of the organization. These documents, along with the Quarterly Project Status Report which tracks the implementation of all capital projects, form the bases for updating BART's policy elements. This process guides management in budgeting for and organizing BART's 2,300-plus labor force in a manner which promotes efficient and effective service.

BART's policy framework is summarized in Figure 2 which shows the individual elements and how they are related. Linkages are represented by a nesting of supporting goals under BART's three mission statements. Each of the mission statements and their respective goals are, in turn, linked to one or more programs which are functional areas of the organization. Each program contains objectives consisting of major projects or activities which are targeted for completion by specific dates. The projects and activities called out as program objectives have been selected on the basis of their high impact in support of BART's mission statements and goals. As an example, the program objective to begin 3-minute 10-second headway service by January 1989, listed under Capacity and Reliability, is an important product of the Capacity Expansion Program which is in direct support of BART's mission to "maximize the effectiveness and efficiency of its operations and bring the system to its full potential." The Capacity Expansion Program objective also relates directly to the first two goals listed under this mission statement which speak to capacity and reliability. The linkages for other program objectives can be traced in the same way.

The remaining policy element, presented in Figure 3, consists of performance indicators which are measures used to gauge the state of the organization on an ongoing basis. The indicators reflect how well BART carries out its mission by working toward fulfilling its goals. The highest level indicators, those which best reflect overall performance, have been designated as key indicators. All of BART's performance indicators measure important aspects of

Figure 2: **BART POLICY FRAMEWORK: MISSION, GOALS, AND FY 1988/89 PROGRAM OBJECTIVES**

MISSION STATEMENT AND GOALS	FY 1988/89 PROGRAM OBJECTIVES
M1: **MAXIMIZE THE EFFECTIVENESS AND EFFICIENCY OF ITS OPERATIONS AND BRING THE SYSTEM TO ITS FULL POTENTIAL.** G1: Operate scheduled 4-route weekday service with route headways of 15 minutes or less during peak and midday periods and expand service within feasible, technical, and financial limits including improved peak-hour frequency of service and capacity where needed. G2: Improve the reliability performance of the present BART system. G3: Continue to improve BART system and patron safety and emergency preparedness. G4: Fund and implement the necessary capital improvements and replacements to the system. G5: Operate within available funds without incurring an unfunded deficit. G6: Make every effort to achieve District objectives for female and minority employment, and disadvantaged and minority business enterprise participation. G7: Improve system access by means of a comprehensive program of parking expansion, BART feeder services, transit coordination, and special projects addressing elderly and handicapped mobility. G8: Develop and maintain a BART workforce that is motivated to provide the best service possible to BART passengers.	**CAPACITY & RELIABILITY** 1. Continue to implement the Capacity Expansion Program such that the completion of the Daly City Turnback and other required projects will allow for the January 1989 startup of 48-train service at a minimum scheduled headway of 3 minutes 10 seconds. **SAFETY** 2. Conduct a minimum of one emergency plan exercise per month involving response agencies. 3. Develop comprehensive implementation plan addressing BART industrial injuries. **ACCESS** 4. Provide 499 additional BART-owned paved parking spaces at existing rail stations by June 1989. 5. Make available a combined BART express bus/rail ticket by June 1989. 6. Complete all elevator conversions by June 1989. **HUMAN RESOURCES** 7. Implement a Districtwide customer service philosophy and assure that departmental objectives and management practices support it. 8. Work to achieve the objectives called for in the Affirmative Action Plan and report performance quarterly.
M2: **MAXIMIZE THE RETURN ON ITS INVESTMENTS IN PROPERTY, RIGHTS-OF WAY, AND FACILITIES.** G9: Increase system utilization by promoting BART travel for all purposes with special emphasis on offpeak and reverse commute trips. G10: Maximize the contribution to operating costs from passenger revenues, consistent with reasonable fare levels, to achieve a farebox ratio above 50%. G11: Develop station area sites for the realization of increased patronage and revenues, and to enhance the communities BART serves.	**MARKETING** 9. Reach and maintain 150 offsite ticket outlets at banks and retail establishments available to the general public, in addition to employer distribution program, with adequate coverage throughout the District. **JOINT DEVELOPMENT** 10. Complete station plans for Hayward, El Cerrito del Norte, and Bay Fair by June 1989. 11. Execute a minimum of one ground lease by June 1989 in concert with ongoing joint development marketing efforts. 12. Work to achieve not less than 15% equity participation in District Joint Development Projects by women and minority individuals and/or disadvantaged business enterprises.
M3: **EXPAND ITS SERVICE AREA TO BECOME THE OPERATOR OF AN INTEGRATED REGIONAL TRUNKLINE TRANSIT SYSTEM WHICH EFFECTIVELY SERVES INTERESTED COUNTIES IN THE BAY AREA.** G12: Extend BART trunk lines within Bay Area travel corridors where feasible and in support of regional land use policies.	**EXTENSIONS** 13. Complete the Alternatives Analysis/Draft Environment Impact Statement/Final Environmental Impact Reports and Locally Preferred Altrnative Reports for both Pittsburg-Antioch and Fremont-South Bay Corridors. 14. Complete the Dublin/Pleasanton Extension Draft Environmental Impact Statement/Draft Environmental Impact Report. 15. Complete the advanced acquisition of at least three extension land sites.

Figure 3

BART POLICY FRAMEWORK
FY 1988/89 PERFORMANCE INDICATORS AND STANDARDS*

SERVICE DEMAND

1. Achieve ridership projections as follows (in 1,000s):

	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	FY 1988/89
TOTAL TRIPS	14,966.1	14,735.9	14,847.0	15,185.5	59,734.4
AVERAGE WEEKDAY	204.5	201.6	206.0	208.0	205.1

SERVICE DELIVERY

2. Make available 85% of A- and C-cars and 90% of B-cars for revenue service by 4 a.m.
3. Provide service such that no more than 3% of peak period trains experience a primary delay exceeding 5 minutes and no more than 8% experience a delay from any cause exceeding 5 minutes.
4. Operate weekday peak period transbay service in the peak direction providing at least 97.5% of scheduled **CAR THROUGHPUT.**
5. Provide capacity where possible such that the load factor at the maximum load point for each train which can be lengthened or shortened (consists between 3 and 10 cars) shall average 1.00 during peak periods and not exceed 1.00 on average in the offpeak.
6. Conduct operation such that 94.0% of all **PATRON TRIPS** are completed **ONTIME.** Also report weekday peak period performance. All patron trips are ontime when trains run not more than 5 minutes late or 1 minute early.
7. Continue to provide an environment for patron circulation within stations and in trains such that the accident rate does not exceed 17.7 per million passengers.
8. Maintain the **AFC INCIDENT RATE** at or below 0.30 incidents per 1,000 passenger trips.
9. Maintain 96.0% availability for elevators and escalators.
10. Maintain express bus ontime performance such that 95.0% of all runs arrive at their final destination within 5 minutes of schedule.

PRODUCTIVITY & EFFICIENCY

11. Achieve a **FAREBOX RATIO** no less than 49.6% for **RAIL OPERATIONS,** 9.9% for express bus operations, and 45.9% for systemwide operations.
12. Achieve a **SYSTEM OPERATING RATIO** of no less than 48.4%.
13. Achieve a **RAIL COST PER PASSENGER MILE** of 21.8¢ or less.
14. Achieve a level of sevice output such that 16,047 vehicle miles are produced per equivalent District employee (based on 2,000 hours worked including overtime, and excluding capitalized and reimbursable labor hours).
15. Improve system utilization (passenger miles per seat mile) to 32.7% through continued monitoring of train capacity to match passenger demand patterns.
16. Reduce the total annual amount of employee lost time due to industrial injuries as a percent of time worked to 0.50% or less.
17. Maintain a paid sick leave rate of no more than 3.50%.
18. Work to maintain 21% minority business enterprise participation for all District contracts determined to have MBE opportunities, including 21% DBE participation for all Federally assisted contracts awarded during the year.

* **KEY INDICATORS** are denoted by bold face capital letters.

performance and provide answers to basic but very important questions such as: How many people ride? How good is the service? How productive is the organization? BART places great emphasis on knowing the demand for its product, the product's quality and how it can be improved, and the effectiveness of its production. Answers to the "how many?, how good?, how well?" questions yield this information. The importance of these questions, in conjunction with their unique influencing factors, has led to the adoption of this framework for presenting BART's 1988 Five Year Plan. Accordingly, all of the performance indicators have been grouped as to: service demand, service delivery, and productivity and efficiency. These headings also serve as the titles for the first three chapters. The fourth and final chapter is entitled Five Year Financial Plan.

THE PLAN. . .AN OVERVIEW

The 1988 Five Year Plan is presented in four chapters. The first, **BART SERVICE DEMAND**, focuses on the **CUSTOMER:** past, current, and potential. This chapter highlights ridership trends and describes the key factors that have affected BART's market share. Current conditions and assumptions about the future are identified, including consideration of extensions in terms of what the future system might look like and its ridership potential. Specific actions to be taken for realizing a greater market share are called out, including consideration of parking and other enhancements affecting how easily people can access the system.

The focus of the second chapter, **BART SERVICE DELIVERY,** turns to aspects of the **HARDWARE** as related to system reliability and capacity. How well trains and vital station equipment perform are looked at, as are the limitations which affect how much service can be provided. This includes limitations on train capacity, what problems are involved, what the realistic service potential appears to be, and what BART is doing to work toward this potential. A highlight of this chapter is the Capacity Expansion Program which is BART's strategy for overcoming systemwide capacity constraints. Rail extensions are brought into this discussion in relation to the current system, how they fit, and what actions are likely to take place within the current five year timeframe. Other aspects of service delivery discussed in this chapter include programs which address safety, station escalators and elevators, automatic fare collection equipment, and BART express bus service.

The third chapter, **PRODUCTIVITY AND EFFICIENCY**, looks at how BART manages its **PEOPLE** and **EQUIPMENT** and their combined effectiveness as related to service production, revenue generation, and cost control. A review of past efforts to increase productivity is presented along with an identification of key influencing factors. BART's strategy for improving productivity and efficiency is highlighted, and the supporting programs and capital projects planned for implementation are identified. This includes consideration of reducing expenses through privatization of selected activities, increasing revenue through joint development, concessions, lease opportunities, and developing a workforce ethic based on motivation to provide the best service possible.

How much it will cost and where the money will come from are the subjects of the final chapter: **FIVE YEAR FINANCIAL PLAN.** The discussion first focuses on BART's **OPERATING BUDGET.** Key factors and assumptions about the future are identified. This includes considerations of passenger and other revenue, and of labor and non-labor expenses. Assumptions are also outlined for key sources of financial assistance. Based on the assumptions for expense, revenue, and financial assistance, a five-year operating budget is presented. Funding shortfalls are called out and prospective measures for balancing the budget are identified. BART's **CAPITAL BUDGET** is presented last. The cost for capital replacement and improvements are identified. Funding sources and amounts by source are projected, and an assessment of funding adequacy is made, along with the impact of a shortfall on BART's capital improvement program.

A SPECIAL NOTE

BART's Five Year Plan is many things to many people. To some, it's a source of technical information. Others are interested primarily in issues and policies, while still others just want to find out how BART is doing and what the future holds. This year's Five Year Plan tries to accommodate all these needs. Every attention has been given to presenting the information clearly, accurately, and completely. Key points appear in **bold** type. BART's mission, goals, program objectives, and performance indicators appear in **bold** type and are underscored. Additionally, a quick reference guide has been included at the beginning of each chapter which outlines the topics covered and presents key chapter highlights. This reference guide also points the reader to reports, studies, plans, and other documents which contain more detailed information. Selected source documents have been compiled into a separately bound **APPENDIX.** Other documents not found in the Appendix may be requested through BART's Office of Research. The reader should also be aware that BART's **CAPITAL IMPROVEMENT PROGRAM,** a companion document to the Five Year Plan, is also available in a separately bound 1988 edition and is the single most important source of information for BART's five-year capital program.

CHAPTER ONE:

BART SERVICE DEMAND

- BART Customers And Those Who Could Be
- Ridership Trends. . .Lessons From The Past
- Today's Challenges And Tomorrow's Targets

CHAPTER ONE REFERENCE GUIDE

BART SERVICE DEMAND

HIGHLIGHTS

- Making BART more convenient is one way to make the system more attractive to current customers and to prospective customers in BART's untapped market which is estimated to be on the order of five times current use.

- Two 7-year ridership growth periods have occurred, each characterized by five years of healthy gain followed by two years of decline.

- Demand for BART increases in response to new and better service and more capacity, and decreases when reliability is inconsistent, capacity insufficient, and fares are raised.

- Dependence on automobiles for getting to suburban stations continues to exert pressure for more parking at stations and will become more acute with the implementation of higher train frequencies. BART will add 499 new spaces in FY 1988/89, with 7,410 more spaces programmed for completion at existing rail stations by June 1993.

- BART ridership is projected to grow at an average rate of 2.8% annually for the next five years to 66.2 million trips for FY 1992/93, including the impact of an assumed 12.5% fare increase effective March 1990.

- Restructuring of AC Transit bus routes, major reconstruction of freeways, higher gasoline prices, and continued regional growth point to greater demand for BART service.

- BART's strategy for promoting additional system use includes placing additional emphasis on service, a marketing program based on information dissemination and incentives, improving station access, increasing station attractiveness through joint development and concessions, and the continuing pursuit of rail extensions.

PERFORMANCE INDICATORS

- Average weekday ridership (Key)

- Total ridership (Key)

REFERENCE DOCUMENTS

- BART Passenger Profile Survey (1987)
- BART Latent Demand Study (1983)
- BART Patronage Study (1986)
- Survey of BART Fast Pass Patrons (1987)
- BART Monthly Patronage Report
- BART Quarterly Performance Report on System Objectives
- BART 1988 Capital Improvement Program
- BART Extensions Summary

Progress for BART means serving people better; better than a decade ago, better than last year, better than yesterday. This requires knowledge of who uses BART. . . and why. Equally as important is finding out why people who could use the system. . . don't. **Progress is based on the pursuit of opportunities.** At BART, identifying opportunities begins with asking people what they think about the service, finding out about customer needs as well as the needs of those who would like to use the system. The Five Year Plan is based on this understanding, an understanding which gives rise to programs and projects aimed at making the system more useful to more people.

BART CUSTOMERS. . . AND THOSE WHO COULD BE

Anyone who lives, works, or plays in the Bay Area could use BART. Of course, the location of the system makes it easier and more practical for some to use than for others. But even for the occassional trip to San Francisco or other destination on the system, BART is there to serve. It's a public conveyance, a way of going someplace. **To two-thirds of BART's current riders, that "someplace" is work; to 15% it's personal business; and to 11% it's school.** These figures come from the 1987 BART Passenger Profile Survey, the tenth in a series of surveys conducted since 1973 which contain information about BART customers. This latest survey indicates BART riders typically:

- Access their station of origin during peak periods by car (52%), walking (27%), and local transit (19%).
- Leave their station of destination during peak periods by walking (74%), local transit (14%) and car (11%).
- Make a round trip on BART (82%).
- Could have used a vehicle available to them for the same trip made on BART (44%).
- Use BART every weekday (63%).
- Have used the system more than 3 years (58%).
- Believe BART delivers them on-time at least 90% of the time (67%).

These are just the highlights of in-depth periodic surveys BART conducts of its customers, users of the system who currently generate about 200,000 trips each weekday. An important point these surveys demonstrate is that **people who use BART are, for the most part, satisfied with the service for their selected travel purposes.** The system plays a part in their lives by satisfying some of their mobility needs. For frequent BART customers, this includes both the journey to work as well as other purposes. Less frequent BART users look to the system for very specific kinds of trips. For these system users, this may include such purposes as attending a sporting event or concert at the Oakland Coliseum, or going on a Saturday outing in San Francisco.

A second important point the Passenger Profile Surveys show is that when all factors are considered, **convenience, more often than not, will tip the scale in a person's decision to use or not use BART.** Making BART more convenient is one way of making the system more attractive to people who are customers now, as well as attracting others who could use the system but presently don't. As with any product, this greater attractiveness leads to greater demand and, for BART, demand means filling trains and recovering a greater portion of operating expenses from fares.

What about those people who could ride BART, but don't? How many potential new customers are there? Why don't they use the system? What would it take to attract them? To help answer these questions BART conducts its Latent Demand Study, the sixth and most recent of which took place in 1983. One highlight of this last study, and perhaps the most widely publicized finding, is that **BART's potential commuter market is on the order of 462,000 people --** people who live within three miles of a station and commute at least five miles to a job location that is within walking distance or short bus ride of a station. Since this survey was conducted, significant numbers of jobs have been relocated away from the central cities to suburban locations. A survey of downtown San Francisco workers is planned for 1988 to measure the current market and learn more about commuter service requirements.

The 1983 Latent Demand Study found that non-user perceptions tended to be governed by limited knowledge which led to their decision not to use BART. For example, non-users were generally unaware of the cost to ride BART and of printed train schedules which BART publishes.

This study suggests that **a sizeable portion of BART's untapped market is lying dormant for want of the most basic kind of information:** At what time and how often do trains run? How long does the train take? How much does the ride cost? There are, of course, very legitimate reasons why people don't ride BART, which are not based solely on schedule and fare information or how reliable the service is. The Latent Demand Study calls out these important considerations, attributes of BART that figure in the total equation of whether or not a person uses the system, or in the case of current customers, how often. These considerations include specific aspects of BART as related to parking, local bus connections, and personal safety, particularly in parking lots and while waiting for a bus outside stations.

Another important aspect, one which cannot be underestimated, is **how people feel they are treated** from the time they enter a station to the time they clear the gates at their destination station. Is there a feeling that BART has a human touch, where a behind-the-scenes and front-line workforce help people and deliver a quality product? Or, do customers feel "they're on their own," at times held captive and at the mercy of impersonal mechanical devices? The 1983 Latent Demand Study said **BART could do better.** This finding, along with others from this study and the Passenger Profile Survey, help BART to uncover areas needing attention and discover new opportunities, for today's customers and for the many more who will be tomorrow.

RIDERSHIP TRENDS. . . LESSONS FROM THE PAST

Demand for BART service is sensitive to many factors. Some BART can control. Examples of these include the considerations which were discussed in the previous section, such as schedules, fares, reliability, safety, station accessibility, and customer information. Clearly, these factors lie within BART's domain. **Other factors lie outside BART's direct control.** Examples of these are gasoline prices, roadway conditions, housing and job markets, connecting transit services, and even the weather. At any point in time, the unique mix of these and other factors determines the level of demand for BART. Travel preferences can shift quickly to BART's main competitor, the automobile. Therefore, attention to controllable factors is essential.

How has BART ridership grown since the system opened in the Fall of 1972? Are the effects of demand-influencing factors readily apparent? To answer these questions, turn to the graph in Figure 4 which tracks each year's average number of BART trips taken on weekdays. The over-all trend is healthy year-to-year increases in ridership except for two periods. Beginning with the first year of operation in FY 1972/73, **the historical pattern is a seven year period repeated twice: five years of growth followed by two years of decline.** A variety of factors helped shape these periods of growth, reflecting different phases in BART's development and corresponding ridership response.

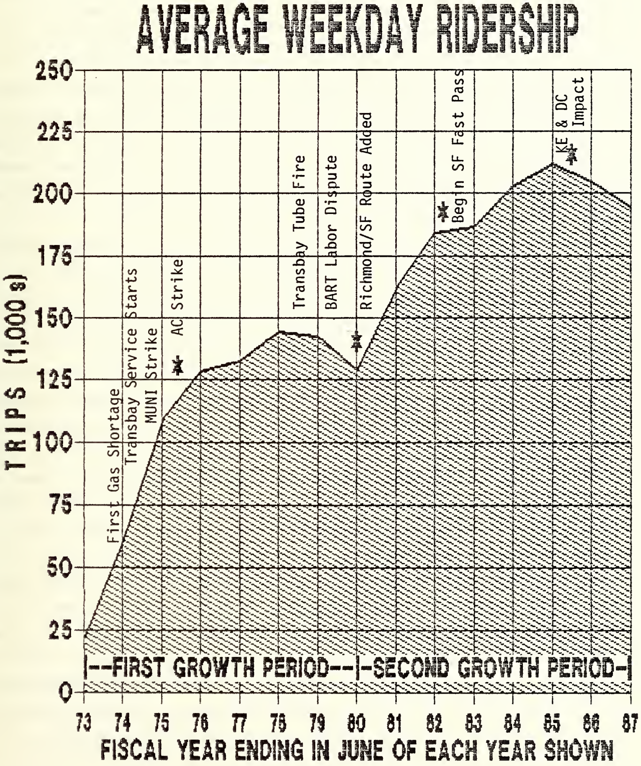
*** The First Seven-Year Growth Period ***

BART ridership climbed steeply between opening day in September 1972 and two years later when transbay service was inaugurated. **The opening of BART's transbay tube** ushered in a new travel era by providing an alternative to the Bay Bridge, the most heavily used highway link in the Bay Area. BART ridership jumped from an average of 69,000 weekday trips in August 1974 to 120,000 in October 1974, the first full month of transbay service.

BART ridership continued to grow but at a slower rate in the year following FY 1974/75. Important events which affected the growth rate in FY 1975/76 included BART's first **fare increase** (in November 1975), the addition of **night service** and a two-month San Francisco Municipal Railway **(MUNI) strike.** Compared to prior year increases, BART ridership grew only about 3% between FY 1975/76 and FY 1976/77. The following year saw an upturn for a 9% gain as a two month Alameda-Contra Costa County Transit **(AC Transit) strike** channeled new customers to BART.

A low level of train reliability began to exert increasing influence on the demand for BART service beginning in FY 1975/76. During the first two to three years of operation, BART customers were tolerant. As time went on, recurring problems caused **less than acceptable ontime performance.** BART staff, recognizing the technical problems, began a program to improve train

Figure 4



Fare increases are denoted by asterisks (*).

reliability. The full impact of the Reliability Improvement Program, however, would not be realized until late 1980.

Two major events occurred in 1979 which had a severe impact on BART ridership. This is seen as the first downturn in Figure 4 as noted for FY 1978/79 and FY 1979/80. The first event was **a fire in the transbay tube** in January 1979. This resulted in an almost three-month closure of the tube and system use dropped from about 150,000 weekday trips to 110,000. During this time, limited train service was operated in the East Bay and San Francisco, with substitute bus service established via the Bay Bridge for transbay travel.

A second event in 1979, which had an even greater impact on ridership than the transbay tube closure, was a **BART labor dispute.** This began to affect train operations before mid-1979 and ultimately led to the curtailment of service for three months that fall. As a result, BART customers had to find other ways of making the trips they formerly made by train. Concurrently, world events led to a second **gasoline shortage** (the first shortage took place in early 1974). This placed added emphasis on the use and need for energy-efficient mass transportation. What ridership gains were made as the result of the gasoline shortage, however, were more than offset by the effects of the transbay tube closure and the BART labor dispute in the final months before the June 1979 contract expiration. The net result of these events was that BART ridership declined about 1% between FY 1977/78 and FY 1978/79. Then, train service was greatly curtailed during the work stoppage between Labor Day and Thanksgiving 1979. Accordingly, weekday ridership for FY 1979/80 dropped 10% from the year before. Nevertheless, **from 1974 to 1980, patronage grew almost 5% per year on average.**

Over the course of the first seven year period, another factor greatly influenced BART service demand: **capacity.** As ridership increased sharply, it became apparent that system constraints preventing BART from delivering more service needed to be lifted. This meant reducing headways, thereby allowing trains to operate at greater frequency. This also meant procuring more cars to form more trains. The seeds of BART's **Capacity Expansion Program** were sown during these early years, seeds which are just now beginning to yield fruits of many years' labor.

*** The Second Seven-Year Growth Period ***

For somewhat different reasons, the second seven-year growth period almost mirrors the first: five years' net increase of about 80,000 average weekday trips followed by two years net decrease of about 15,000. During the first period, increased demand for BART followed new service and capacity additions within very congested travel corridors. At the start of the second period, a similar **ridership increase was triggered** when BART's Reliability Improvement Program made possible direct service on the Richmond/Daly City route. This additional capacity, along with a **doubling of train ontime performance** from about 45% in FY 1978/79 to just over 90% in FY 1980/81, provided important **marketing advantages** for BART. People who were already riding the system noticed the difference. Trains ran more frequently. Delays were fewer. The news spread. The two-year ridership decline ended.

Within the next five years, BART ridership shot up and peaked at an average of 211,600 weekday trips for FY 1984/85. This occurred despite two fare increases, one in July 1980 and another in September 1982. Growth during this second period exceeded that of the first. **Ridership expanded 5.3% annually from 1980 to 1985,** including the effect of the 1982 fare increase. BART now had a quality product to sell. This ushered in a **more agressive approach to marketing.** Greater use was made of advertising. Increasingly, BART began to be promoted as a way of going to major special events. Not only did BART's commute traffic pick up but so did that for the midday, night, and weekends. More and more people considered BART as good for going to the ballgame or parade as for going to work.

BART's emergence in the early 1980s as a dependable means of transportation pumped **new interest into extending the system.** The region as a whole was experiencing considerable growth, which at the time was accelerated by the dominance of Silicon Valley as the world center of the semiconductor industry. To BART, extensions represent a way of tapping new markets by serving areas where rail transit makes sense. To the Bay Area, BART is a means of providing regional mobility to many without having to pave over more of the landscape with new and wider highways.

As ridership grew in the early 1980s, **lack of station parking became more of a problem** for BART customers and a deterrent for would-be riders. Because of high dependence on cars for access to stations in outlying areas, BART customers began to notice increased difficulty of finding a parking space. BART had 20,500 parking spaces in July 1980, at the very beginning of the second growth period. Surveys taken at that time show that station parking was 94% filled by noon on weekdays. Parking capacity lagged far behind demand. Today, BART has over 25,600 spaces at 24 of its 34 stations, or 5,100 spaces more than eight years ago. Most station parking lots, however, still fill during the morning commute period. This seriously limits midday station accessibility when ample rail capacity is available. If the past offers any clue as to what the future may hold, **BART can expect new parking capacity to be quickly consumed as more people are attracted to the soon-to-be implemented new train service.**

Despite these constraints, demand for BART service remained strong through FY 1984/85. A fare increase in September 1982 slowed ridership growth, but only temporarily. A 2% gain was realized between FY 1981/82 and FY 1982/83. The following year weekday ridership shot up almost 9% from 186,300 in FY 1982/83 to 202,500 in FY 1983/84. Contributing to this increase was the acceptance of the **MUNI Fast Pass** as fare payment on BART for travel within San Francisco. This joint project included a revenue-sharing agreement and modification of BART's faregates to accept the pass. Beginning in April 1983, BART had a lot of new customers, people who formerly rode parallel MUNI surface routes with Fast Passes. BART's travel-time advantage was substantial. The fact that people now had BART as a "free" option, made the Fast Pass and BART all the more appealing. The first six months of Fast Pass use on BART averaged about 15,000 weekday trips. Today, five years later, the figure is twice that. The success of the combined BART/MUNI Fast Pass demonstrates the effect of another important factor which has influenced BART demand: **coordination of transit fares, schedules, and transfers.**

During the fifth year of the second growth period, ridership went up more than 4%, from 202,500 in FY 1983/84 to 211,600 in FY 1984/85. This is the highest annual average weekday ridership BART has ever achieved, one which peaked in April 1985 at just over 216,100 weekday trips.

By mid-1985, ridership growth seemed to stop. Month-to-month averages hovered around 214,000 between February and September. A noticeable dip followed in

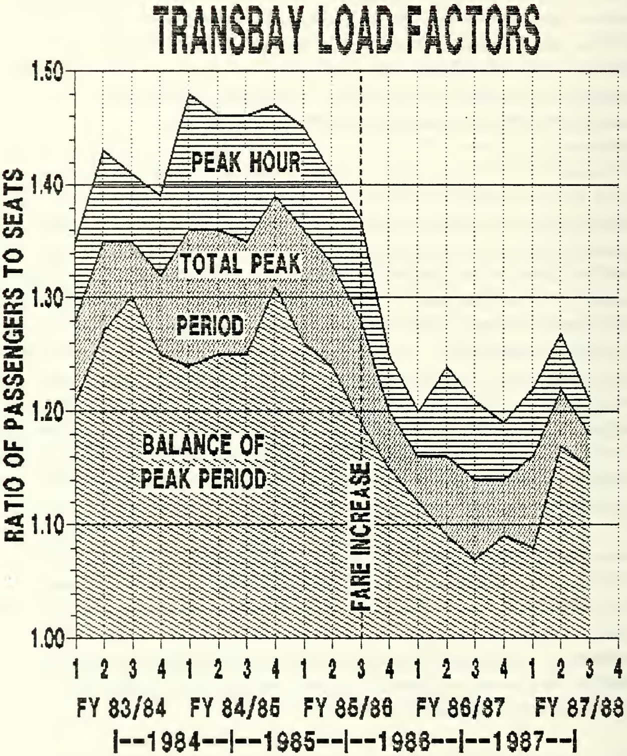
October. What was happening? Were five years of growth drawing to aclose or just taking a pause? Looking back, two things seemed to be working against BART. The first was **limited capacity.** With BART's entire fleet pressed into service, train loadings had nowhere to go but up as ridership increased. Figure 5 shows this. All during FY 1984/85, transbay trains in the peak commute hour, on average, carried just under 150 people for every 100 seats. The most heavily loaded train carried over 180 people for every 100 seats. The limit of BART customers' tolerance of train crowding seemed to have been reached, and no remedy was in sight. BART didn't have any more cars and the Capacity Expansion Program was still to be implemented.

The second factor limiting BART demand in 1985 was **service reliability.** A solid five year record of dependable train service was undermined by the very same projects BART needed to improve performance. Between July 1985 and January 1986, the final construction stages of the KE Track (the third mainline track and related train storage tracks in downtown Oakland) required manual train operation over a very complex part of the system where three routes merge. Measures were taken to minimize the impact, but BART customers noticed the difference. Trains ran slower through the construction zone, and stop-and-go action under manual train control did not provide the customary smooth ride. A construction stage for a second Capacity Expansion Program project, the Daly City Turnback, also impacted BART's ability to deliver its scheduled service. Between August 1985 and April 1986 each of the three train berthing platforms at Daly City Station had to be rotated out of service as part of this construction.

In retrospect, it is clear that limited capacity and service reliability problems put a definite end to five years of ridership growth. **A special study conducted in late 1986 showed that after the fare increase, more commute riders abandoned the system than those who rode midday, at night, or on weekends.** This went against past experience with fare increases, not only for BART but for the entire transit industry, which experiences greater losses of offpeak riders when fares are raised.

BART's patronage erosion as the result of higher fares was virtually as expected, 8% actual versus 7% predicted. The lack of growth after the one-time drop, however, was unexpected. Other factors appeared to have

Figure 5


TRANSBAY LOAD FACTORS
RATIO OF PASSENGERS TO SEATS
1.50
1.40
1.30
1.20
1.10
1.00
PEAK HOUR
TOTAL PEAK
PERIOD
BALANCE OF
PEAK PERIOD
FARE INCREASE
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 83/84
FY 84/85
FY 85/86
FY 86/87
FY 87/88
|--1984--|--1985--|--1986--|--1987--|

inhibited a recovery. One of these factors is the **shift in the job market** from downtown to suburban locations. Firms which relocated large numbers of employees from San Francisco included Chevron, Bank of America, Pacific Telephone, and Fireman's Fund. This outmigration of jobs began to be noticed about the same time BART ridership peaked in mid-1985.

A second factor the 1986 Patronage Study found which also worked against a ridership recovery was the **growing popularity of casual carpooling.** AC Transit first noticed this as an imbalance in its transbay ridership. Buses tended to carry more people out of San Francisco in the afternoon commute period than they did going into the City in the morning. The "lost riders" were found neatly lined up each morning at key transbay bus stops in Oakland and Berkeley. These locations became the staging grounds where people waited, not for buses, but for free rides with lone drivers who, with 3 or more occupants, could bypass the very congested approach to the Bay Bridge and avoid the 75¢ one-way toll. BART soon developed an imbalance in transbay ridership. Orinda Station became another staging ground for casual carpooling, only here, BART customer parking was being consumed by carpoolers who would drive to Orinda Station and park, and then ride with someone else by car to San Francisco.

Other factors examined in the 1986 Patronage Study were **gasoline prices,** which fell significantly with a drop in world oil prices in early 1986, and **fraudulent use of the BART/MUNI Fast Pass.** The Study attributed less impact on BART ridership to these factors than the January 1986 fare increase, the job market shift, or casual carpooling.

By Spring 1986, train service reliability returned to favorable levels following completion of the KE Track and the mainline tie-in phase of the Daly City Turnback. Additionally, BART has taken measures since the 1986 Patronage Study to control Fast Pass abuse by transbay riders and casual carpooling at Orinda and Lafayette stations. **Ridership has maintained a relatively flat profile since the fare increase at around 195,000 weekday trips, and is only just now showing signs of a sustained upswing.**

In summary, **the main lesson derived from analysis of the two seven-year growth periods is that service availability and reliability are essential to the**

continued expansion of BART ridership. Growth cannot occur without sufficient capacity. Service interruption or reduction has been a prime cause of past downturns in BART ridership. Given the variety of external factors which can negatively impact system use, BART must avoid any actions within its control which may decrease patronage.

TODAY'S CHALLENGES AND TOMORROW'S TARGETS

BART faces a number of challanges in terms of increasing the demand for its service. The strategy for dealing with each draws from what's been tried and proven successful as well as what's new and promising. As housing satisfies the basic human need for shelter, transportation fills the same role with regard to mobility. Because of this, BART will always have a potential market for its service. However, progress requires action to cultivate what is potential into what is real. It follows that BART's strategy for realizing more of its potential is through well thought out programs and projects which, when taken together, **tailor BART service to better fit customer needs.**

How well BART is doing in terms of stimulating demand for its service is measured by two **performance indicators,** both of which are key indicators. The first is **average weekday ridership,** the common denominator for comparing actual BART ridership to forecast as well as comparing BART ridership to other transit systems. The second performance indicator for service demand is **total ridership.** This measure accounts for all BART travel, that occurring on weekends and holidays as well as weekdays. This indicator is directly linked to passenger fare revenue, and as such, is an important budget consideration.

The 1988 update of BART's five-year patronage projections closely resembles the 1987 five-year forecast. The underlying methodology is unchanged; the current projections differ from last year's only because of changes in assumptions regarding the timing of new service increments and a possible fare increase. No other new information which would change the forecasting process is available or considered directly relevant.

Ridership seems to be following the trend projected a year ago. Through the first nine months of FY 1987/88, patronage is 98.9% of forecast. A small but noticeable upswing is apparent in Figure 6, which shows actual and projected average weekday ridership for the last five fiscal years by quarter.

The FY 1987/88 forecast anticipated a greater response to the **$35 high-value ticket promotion** between September and December 1987 than apparently occurred. Ridership levels seem to be holding firm after the promotion, however, indicating that riders continue to be generally indifferent to this price change. The forecast also assumed that **delivery of C-cars** would permit the lengthening of some trains and the consequent reduction of peak load factors. Introduction of these cars has been delayed six months. Ridership increases may continue without this additional capacity as indicated by the recent upturn in load factors in Figure 5.

The two main factors on which BART's current five-year patronage forecast is based are expansion of peak period capacity and overall expansion of the population and employment of the region. **At current fares, continuing regional growth is expected to sustain a 2.5% yearly increase in offpeak riding and a 2.7% annual growth in peak demand, with the exception of transbay routes during the peak hour.**

Future demand for transbay peak hour service is projected to respond to planned capacity expansion in much the same way that was observed between 1982 and 1985. During that period, trains which could be lengthened to maintain low to moderate load factors experienced more growth than those which were more heavily loaded. This ridership growth was used to project future demand response to longer and/or additional trains which will reduce load factors in the same way as occurred previously. Projections for the upcoming five-year period for average weekday and total annual trips are shown in Figure 7. The timing of planned service improvements is as shown in Figure 15 which will be discussed in detail in the next chapter.

Given the large financial deficits anticipated in both the 1987 plan and this update, **a 12.5% fare increase** effective March 1990 is assumed for planning purposes. This increase is in line with growth of the cost of living and should help offset part of the projected deficit.

Figure 6

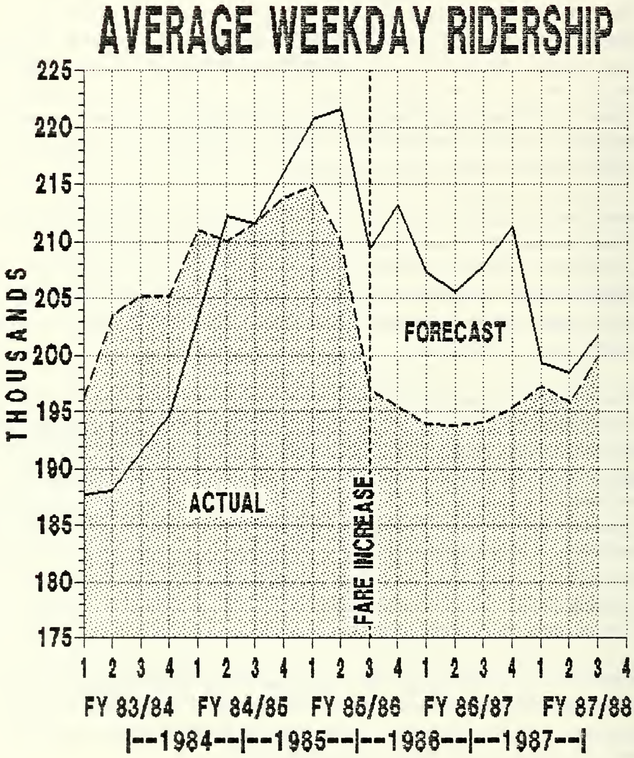
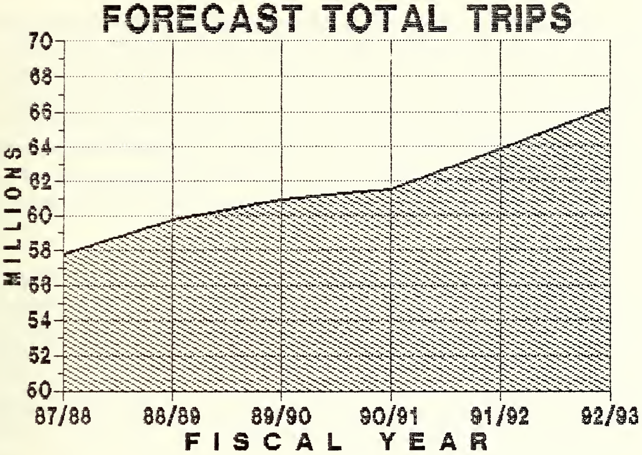
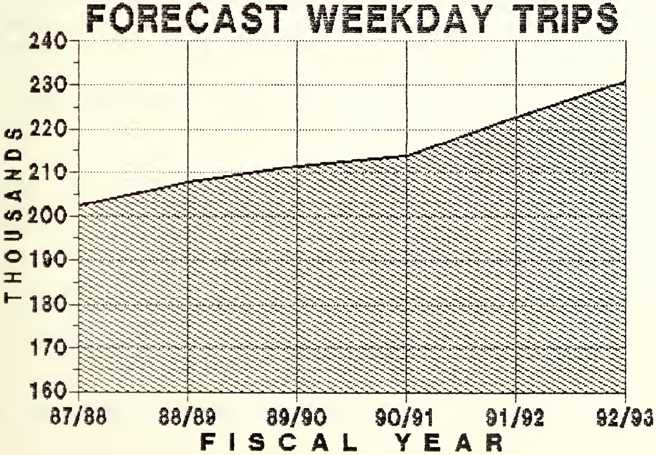

AVERAGE WEEKDAY RIDERSHIP
THOUSANDS
225
220
215
210
205
200
195
190
185
180
175
ACTUAL
FORECAST
FARE INCREASE
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 83/84
FY 84/85
FY 85/86
FY 86/87
FY 87/88
|--1984--|--1985--|--1986--|--1987--|

Figure 7


FORECAST TOTAL TRIPS
MILLIONS
70
68
66
64
62
60
58
56
54
52
50
87/88
88/89
89/90
90/91
91/92
92/93
FISCAL YEAR


FORECAST WEEKDAY TRIPS
THOUSANDS
240
230
220
210
200
190
180
170
160
87/88
88/89
89/90
90/91
91/92
92/93
FISCAL YEAR

What other factors may impact BART's future demand? The forecast assumes that **service reliability will continue** at the level provided during 1986 and 1987, as service is expanded. The discussion above showed the importance of reliability. Other factors that should support the projected increase in demand include: additional BART parking, **a possible introduction of a second** generation **AC/BART Plus** ticket to improve transfer convenience, **restructuring of AC Transit** bus service to improve access, **increased freeway congestion** during highway reconstruction and expansion projects, and likely **increases in gasoline prices.**

Two developments are hard to gauge but could reduce the rate of growth of demand for BART. Relocation of employment from central areas to suburban locations seems to have impacted BART ridership since 1985, although conclusive data are not available to indicate by how much. **Job relocation will probably continue**; the key unknowns center on whether the rate of such relocations will continue or decline, and what type and number of jobs will occupy the offices vacated by relocating firms.

Lifestyle changes offer another challenge to BART. These include casual carpooling, computer based communication systems offering the possibility of working at home, and the possibility that the number of women entering into the workforce may have peaked causing employment growth to slow. These and other related factors are largely beyond BART's ability to control or even significantly influence. Such factors will need to be monitored carefully so that their impact can be anticipated in future plans.

The challenges BART faces with respect to advancing the system in step with its ridership objectives and other policy elements lie on a series of fronts. For BART, front-line actions correspond to sets of activities which describe program areas. Accordingly, **the strategy for realizing a greater share of BART's market** is presented in the following sections by program area. Additional details for individual capital projects are contained in BART's 1988 Five Year **Capital Improvement Program,** which is under separate cover.

*** Capacity and Reliability ***

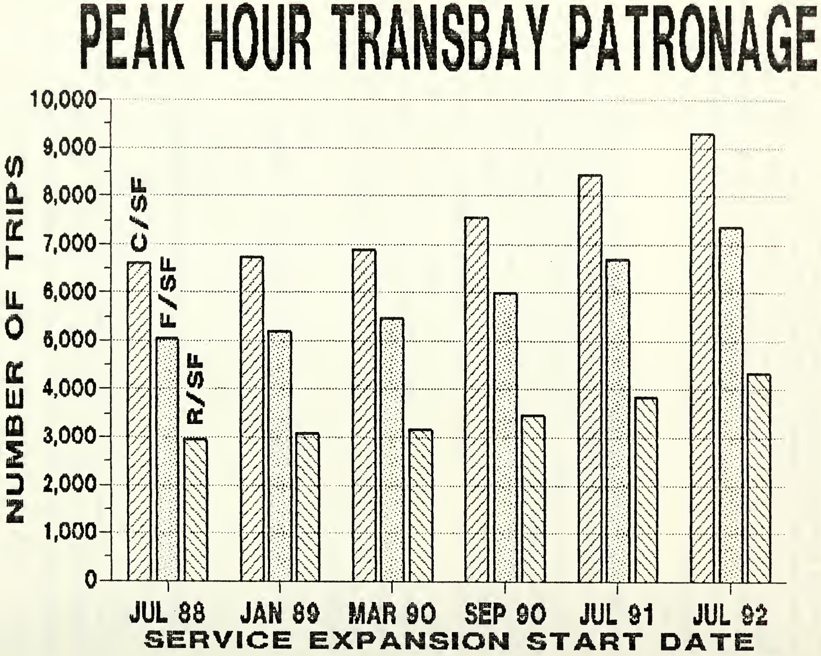
The demand for BART service has repeatedly been shown to be strongly influenced by system capacity and service reliability. This direct linkage and the need for improvement are the cornerstones of **BART's Capacity Expansion Program** which is to be fully in place by mid-1990. New train service, which has already been added under this program, will continue to be phased in over the next two years. (Details of individual capacity expansion projects and their implementation are presented in the next chapter which covers service delivery.)

What BART riders will see and what will be the focus for attracting new customers is **more frequent and reliable service.** By mid-1990 the completion of the Capacity Expansion Program will allow trains to operate as close as 2-minutes 15-seconds apart. The merging of routes in downtown Oakland and through San Francisco requires train spacing on any one route to be two to four times this headway. This translates to a range of possible headways for individual routes of between 5 and 15 minutes depending upon how available train "slots" are filled to meet varying demand. **By mid-1990, BART will be capable of providing 26 transbay trains per hour in the peak demand direction compared to 17 now.** Based on each route's current service and projected new demand as shown in Figure 8, afternoon rush-hour transbay BART service could consist of:

- 11 Concord trains versus 7 now departing San Francisco.
- 9 Fremont trains versus 6 now departing San Francisco.
- 6 Richmond trains versus 4 now departing San Francisco.

The current maximum frequency of 5 trains in the peak hour on the Richmond/Fremont route is not expected to change during the next five years. This is based on this route's current demand and corresponding train lengths which are well below the allowable ten-car limit. This means that additional demand for this route will be accommodated by lengthening already scheduled trains. **The C-car project is a key to element providing this needed capacity.**

Figure 8


PEAK HOUR TRANSBAY PATRONAGE
NUMBER OF TRIPS
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
C/SF
F/SF
R/SF
JUL 88
JAN 89
MAR 90
SEP 90
JUL 91
JUL 92
SERVICE EXPANSION START DATE

More and better service means **less waiting** on the platform, **a better chance of getting a seat,** and a **more predictable travel time.** Over the course of the next two years, BART will be adding frequency and capacity to its current schedule as shown in Figure 9. The programmed service has been planned to both promote and accommodate a forecast of **233,800 average weekday trips by June 1993**. This increase is the result of current BART customers riding more often, as well as new customers who are attracted to BART because of added convenience and comfort afforded by the new service. (The details of new service plans are discussed in the next chapter.)

*** Safety ***

Safety is an undisputable requirement with which there is no compromise. BART will continue to aggressively pursue all it can do to maintain **high safety standards.** BART's insistence on favorable safety performance contributes to public confidence in the system, an attribute which works in favor of promoting increased ridership.

BART's safety department is involved in every aspect of service for which safety oversight is needed. This includes concern for how trains, elevators, and escalators operate, and how passengers circulate on station platforms and stairways. The **emergency preparedness program** will continue to be the vehicle for coordinating BART's safety activities with those of local emergency providers (i.e., fire departments, first aid units, hospitals, etc).

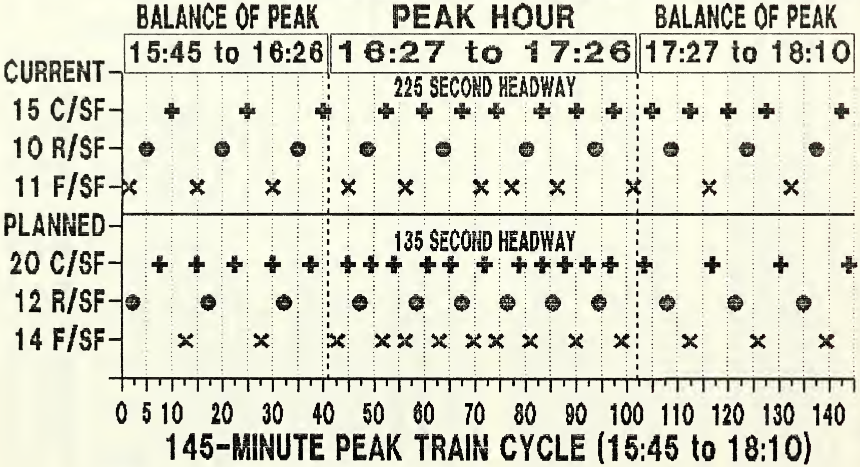
With regard to security, BART will continue to deploy strategically its sworn police officers (130 currently) in the surveillience of trains, stations, parking lots, and other BART property. **Whether committed against customers or property, crimes on BART are a deterrent to system use.** If people feel unsafe, they may be less willing to ride. The establishment of BART Police Services in 1976 as a fully sworn law enforcement unit is evidence of BART's committment to providing transportation that is both safe and secure.

*** Access ***

The easier it is to get to and from BART, the more people will ride. This philosophy has guided BART's access program which seeks to make it easier for people of all ages and physical capacities to come and go by bus, car,

Figure 9

PEAK PERIOD TRANSBAY SERVICE



NOTES:

(1) Sequence starting at 3:45 PM from Embarcadero Station.

(2) Current and planned service for Richmond/Fremont is 10 trains.

(3) Throughput on Richmond/San Francisco equals one train more than on line due to shorter route and run time.

bicycle, wheelchair, or on foot. BART's access program also deals with the special mobility needs of elderly and handicapped customers' use of the rail system as well as BART express buses.

Adding new train service is, without a doubt, a key element needed for capturing a greater share of BART's market. But increased train frequency alone is not enough. For BART to become more useful to substantially more people, **improvements must focus on door-to-door travel time.** BART's access program can have a great influence on ridership. To take full advantage of the half billion dollar investment in increased service frequency and capacity, BART will be improving access by making the system more attractive in terms of the ease, time, and cost of getting to and from stations.

Easier Access By Car: Past studies have shown the need for more station parking. The most recent study, which was conducted in late 1987, reveals that over **4,500 BART customers park outside station lots due to lack of space.** This study also notes that parking restrictions have prevented more people from parking in neighborhoods near stations where local ordinances are in effect. The parking deficiency is most severe at the four outer Concord-line stations which fill before 7:30 a.m. These same four stations also account for about half of the 4,500 BART customer cars parked on neighborhood streets. Other stations which have comparable fill times and neighborhood impact are Oakland West and El Cerrito del Norte. Figure 10 summarizes **BART's parking expansion program which will add 499 new spaces by June 1989 and 7,410 more spaces by June 1993.** (For additional details concerning individual projects and costs, refer to BART's 1988 Capital Improvement Program.)

Easier Access By Bus: Opportunities for improving bus/rail connections which have the greatest potential for increasing ridership exist in the East Bay. This involves AC Transit which provides bus service to 20 of BART's 25 East Bay stations. BART is currently working with AC Transit on its route restructuring plan which they anticipate implementating over the next 5 years. Changing demand patterns for AC Transit service and the need to productively accommodate them require **more coordinated feeder service to BART** than presently exists. Bus routes will be oriented more toward serving BART

Figure 10

BART-OWNED PARKING SPACE INVENTORY AND PROGRAMMED EXPANSION
PAVED FACILITIES AT EXISTING RAIL STATIONS AND EXPRESS BUS PARK/RIDE LOTS

	STATION	SPACES AS OF MARCH 1988	PROGRAMMED ADDITIONS			PLANNED SPACES AS OF JUNE 1993
			APR-JUN 88	FY 1988/89	FY 89/90 - 92/93	
SAN FRANCISCO LINE:	Daly City	1,877	0	0	0	1,877
	Glen Park	55	0	0	0	55
	Oakland West	403	0	0	1,200	1,603
	SUBTOTAL	**2,335**	**0**	**0**	**1,200**	**3,535**
FREMONT LINE:	Fremont	2,374	0	0	0	2,374
	Union City	1,166	0	0	300	1,466
	South Hayward	1,252	0	0	0	1,252
	Hayward	967	0	0	950	1,917
	Bayfair	1,761	0	0	0	1,761
	San Leandro	1,226	0	0	0	1,226
	Coliseum	923	0	0	0	923
	Fruitvale	1,025	0	0	560	1,585
	Lake Merritt(a)	190	0	0	0	190
	SUBTOTAL	**10,884**	**0**	**0**	**1,810**	**12,694**
RICHMOND LINE:	Richmond	754	0	0	0	754
	El Cerrito del Norte	1,607	0	0	900	2,507
	El Cerrito Plaza	509	0	54	0	563
	North Berkeley	524	0	252	0	776
	Ashby	560	0	0	0	560
	MacArthur	609	0	0	0	609
	SUBTOTAL	**4,563**	**0**	**306**	**900**	**5,769**
CONCORD LINE:	Concord	1,912	0	0	600	2,512
	Pleasant Hill	1,678	0	193	1,200	3,071
	Walnut Creek	1,263	0	0	1,200	2,463
	Lafayette(b)	1,446	0	0	0	1,446
	Orinda(b)	1,320	0	0	0	1,320
	Rockridge	776	0	0	500	1,276
	SUBTOTAL	**8,395**	**0**	**193**	**3,500**	**12,088**
TOTAL: RAIL STATIONS		**26,177**	**0**	**499**	**7,410**	**34,086**
BART EXPRESS BUS PARK/RIDE FACILITIES:						
	North Concord/Martinez	538	0	0	0	538
	West Pittsburg	213	0	0	0	213
	Pittsburg	0	0	0	200	200
	West Antioch	0	0	0	0	0
	East Antioch	252	0	0	200	452
	Dublin/Pleasanton	0	0	0	0	0
	West Livermore	0	0	0	200	200
	Hercules	0	0	0	0	0
TOTAL: EXPRESS BUS PARK/RIDE		**1,003**	**0**	**0**	**600**	**1,603**
GRAND TOTAL: RAIL STATIONS AND EXPRESS BUS		**27,180**	**0**	**499**	**8,010**	**35,689**

(a) A 25¢ parking charge is in effect at Lake Merritt Station. All other BART-owned parking is free.
(b) These free spaces at Lafayette and Orinda Stations are subject to special parking controls.

stations as key destinations. Bus arrivals and departures will be scheduled so that connections to and from BART trains can easily be made. Improvements like this have already been made for some of Central Contra Costa County Transit Authority's (CCCTA) bus routes which provide access to five Concord-line stations. This restructuring has cut waiting times and, for longer trips, door-to-door travel times. These incentives stimulate ridership for BART as well as for the connecting bus service. BART and AC Transit are seeking funding for capital projects at various BART stations to accommodate AC's route re-structuring and to improve the comfort and safety of riders. Similar efforts are underway with CCCTA.

In advance of bus route restructuring, a six-month demonstration project for Hayward Station is to be implemented beginning in May 1988 for the purpose of testing the effect on ridership of timed transfers between buses and BART trains. This joint demonstration project involves the coordination of up to 15 AC bus routes, one San Mateo County Transit (SAMTRANS) bus route and one BART express bus route, all of which serve Hayward Station.

Complementing the route and schedule improvements, is the AC/BART Plus Ticket, a single ticket which is currently available and permits unlimited AC Transit riding in combination with a stored BART fare. (This semi-monthly ticket is available in varying denominations depending upon travel distance.) **BART will also introduce in FY 1988/89 a combined ticket for use on BART express buses and trains.** This along with **express bus route modifications** to cut travel times, completion of **express bus park-ride lots,** and special **pricing incentives** are expected to **attract more train riders** by making BART stations more accessible.

Another access project is the **Daly City Station Intermodal Facility** which will improve the internal circulation for buses, as well as for pedestrians and cars. Daly City Station is the fifth busiest after the four downtown San Francisco stations and is a terminal for 20 bus routes operated by SAMTRANS and three MUNI routes.

Easier Access For The Elderly And Handicapped: The BART Task Force on Access for Elderly and Handicapped Persons meets regularly with BART staff for the purpose of identifying projects which may improve BART accessibility for mobility-, vision-, and hearing-impaired customers. BART will be completing an **elevator modification program,** an improvement which was developed in consultation with the Task Force. When completed, station elevators will be equipped with intercoms, closed circuit monitors, new self-operation call buttons which will be lower for easy reach by customers in wheelchairs, and elevator call-card readers.

*** Human Resources ***

How BART employees feel about their work directly impacts their productivity (the subject of Chapter Three) and the quality of BART service. This, in turn, affects both demand and BART's overall financial outlook. As part of its strategy to stimulate demand, BART is placing additional emphasis on customer relations and will be working to improve the way in which business is conducted at all levels in support of a **new goal added this year: Develop and maintain a BART workforce that is motivated to provide the best service possible to BART passengers.** For new as well as existing riders, BART needs to improve the "user friendliness" of its trains, its stations, and its people.

*** Marketing ***

Service and improvements will be marketed aggressively with specific programs and strategies outlined in a separate marketing plan. The marketing plan will be designed to support BART's short- and long-term objectives, with research findings serving as the foundation for strategies employed. A portion of BART's potential market is expected to be very responsive to the new service. Infrequent BART riders will ride more often. Word will get around to others that there are more and longer trains in service, bus connections are better, and there's more parking.

Other market segments, consisting of people who could use BART but don't, may be more difficult to capture. Reasons for this are linked to awareness and habit. The primary focus of BART's marketing program are these less responsive potential customers. These are people who may have limited or outdated knowledge about BART and who may not question their established travel habits.

The strategy for stimulating all segments of BART's potential market is based on information and incentives. Information means knowledge on which to base a decision. Incentives mean motivation to act on that decision. This translates to more people first thinking about BART as a way of satisfying some of their mobility needs, followed by decisions to actually use it.

Information: Marketing activities will focus on disseminating information about BART through a variety of vehicles including use of direct mail **print and broadcast media.** Marketing activities will also focus on making specific kinds of information available to customers to assist them in their travel plans and use of the system. This is particularly important for infrequent or first-time customers who may have limited or no knowledge of how or where to buy tickets, train routes and schedules, and key destinations the system serves. To meet this need, BART will continue to make available **special brochures** which provide information about these and other aspects of the system. Advance notice about **special train service** to major events will also be made available as part of marketing BART for non-work trips.

Additionally, BART will be expanding the **information centers project** to all stations which have been designated as regional transfer stations. This Regional Transit Association sponsored project (the RTA is a special joint-powers agency consisting of seven Bay Area transit operators), consists of information display cases showing local bus routes, schedules, and points of interest near BART stations. BART will also be **improving signing** and providing **train schedule information** on the platform level of stations.

Incentives: BART will aggressively market service to major Bay Area events served by the system. Demand for an event, such as the annual Bay-to-Breakers footrace in San Francisco, may warrant **special service** during a time period when trains normally don't operate (i.e., before 9 a.m. on Sundays) or **extra service** during regular hours. BART will be studying the impact of providing **more frequent service** at night and on Sundays when trains run 20 minutes apart on two of the system's four routes as an incentive for increased ridership. Based on the outcome of this study, additional service may be provided.

Incentives which encourage greater system use will also be provided by a **variety of pricing mechanisms,** most of which are currently in effect. These include **discount travel,** currently at 90%, for children between the ages of 5 and 12 years of age (children under 5 can ride free), persons 65 years of age and over, and anyone having a mobility impairment which qualifies under the Regional Transit Discount Program. Regular adult fare discounts will continue to be provided by the sale reduced-priced high value tickets. Currently, $32 tickets are available for $30.

BART will be stepping up efforts to **increase the number of offsite ticket sales outlets,** the only places where discount tickets are sold. Just over half of BART's offsite ticket outlets are banks and retail stores. The target is to increase these outlets **from 132 now to 150 by June 1989.** Other offsite ticket outlets generally do not sell discount BART tickets to walk-in customers, but are for the convenience of a specific clientele. These include employers, schools, senior centers, and disabled centers. Employers constitute the majority of these outlets, which currently number 80 out of a total of 100. The marketing of transit with regard to employer participation falls largely under the direction of the RTA. BART, however, will be aggressively working to increase further the number of participating employers in this program.

An additional incentive will be **AC Transit's restructuring of its bus routes** which will make both BART and AC more accessible to more people. Activities will focus on increasing the public's awareness of these improvements along with **marketing the service** in the form of a single bus/rail ticket, like the current AC/BART Plus Ticket. Similar activities are planned for BART express bus service.

*** Joint Development ***

Joint development at stations represents good landuse planning by concentrating development where people have an alternative to the automobile. As such, BART's joint development program has significant long-range implications for ridership. Multiple-use developments in the vicinity of rail stations **create new markets for BART service,** markets which would otherwise not exist. In support of stimulating ridership and creating these new markets, BART will be continuing its efforts to market selected station sites for development.

During FY 1988/89, BART expects to sign **a minimum of one ground lease**. Additionally, **station area plans for Hayward, El Cerrito del Norte, and Bay Fair** are slated for completion by June 1989. These plans will provide direction for future joint development activities at these stations.

*** Concessions and Property Management ***

BART's **concessions program** focuses on the leasing of space within stations. This program, too, has the potential for increasing ridership by making the system more attractive in terms of the services housed within stations. BART is currently negotiating with a major firm for the opening of newspaper, gifts, and sundries shops at eight high volume stations. Other efforts are focusing on establishing Federal Express drop facilities at 32 stations. Additionally, several financial institutions have expressed interest in setting up an ATM network in stations which would be capable of dispensing both cash and BART tickets in conjunction with the use of credit or debit cards.

Efforts to realize these and other enhancements to stations will be carried forth in the current planning timeframe. **The potential ridership gains expected to occur from both the joint development and concessions programs are substantial**, as are their impacts on revenue generation, a subject discussed in Chapter Three.

*** Extensions ***

BART was conceived and grew out of a need for a regional rail system linking population centers which are separated by land and water barriers. The events which led to the current three-county District have helped shape BART's policy on extensions. Briefly, this policy places a first priority on fulfilling BART's obligation to Alameda, Contra Costa, and San Francisco counties, BART's member counties. The details of BART's extension policy along with the issues and future outlook are the subjects covered in Chapter Two: BART Service Delivery. The discussion follows Chapter One's theme which focuses on the market for BART service.

Extending BART means reaching into new markets; each extension tapping a unique reservoir with its own potential for generating BART trips. The ridership implications of an extension depend largely on population and employment patterns, and how well the existing transportation network is handling the demand. The following summarizes each proposed BART extension, the areas served, and the level of ridership projected based on the most recent adopted studies (patronage forecast dates do not imply extension service start dates).

Pittsburg-Antioch: Pressures in the more densely developed central part of the Bay Area have resulted in substantial population increases in this corridor, and the need for long-distance commuting. The corridor is traversed by the SR-4 freeway and is served by a relatively low level of local transit. Additionally, BART express buses provide service to Concord Station at about half the frequency of Concord-line trains for any given service period. The proposed **5-station** extension is **15.4 miles** long and has been forecast to generate **36,200 weekday trips** at full operation.

Livermore-Pleasanton: Development pressures and resulting travel patterns for this corridor are similar to Pittsburg-Antioch. Current local transit service is also at a relatively low level. BART express buses link the Livermore Valley with BART at Bay Fair and Hayward stations to the west, and Walnut Creek Station to the north. The **first phase** extension is a **12.8 mile** line from Bay Fair Station to Dublin, most of which is in the median of I-580, the Valley's only highway link to the more densely populated communities directly to the west. Ridership estimates for this **2-station** extension project **24,400 weekday trips** in the year 2005. **Under phase II,** extending the line **11.4 more miles** to Livermore with **3 additional stations** is projected to generate **5,700 weekday trips**; for a total of **30,100 trips for the entire 5-station/24.2 mile line.**

West Contra Costa County: Lying between Richmond and the Carquinez Bridge and traversed by I-80, this corridor has experienced rapid growth in the past decade. Travel demand is compounded by similar development to the northeast, all along I-80 between Vallejo and Sacramento. Caltrans will be reconstructing I-80 over the next several years. The proposed **7.6 mile** BART line is a **4-station extension** of the Richmond line. Ridership is projected to be between **10,000 and 15,000 weekday trips** at full operation.

Fremont-South Bay: The area between Fremont and San Jose has experienced rapid growth in population and jobs, a sizeable portion of which are related to the computer industry. The primary arteries traversing the corridor are

I-680 and I-880. This latter freeway, also known as the Nimitz, is one of the Bay Area's most congested highways, and is just now starting to undergo a six-year reconstruction program. A **5.4 mile extension** from Fremont Station to the Alameda-Santa Clara county line would add **2 stations** and is projected to generate **12,000 to 15,000 weekday trips** by the year 2000. Continuing the extension into Santa Clara county **14.0 additional miles** to downtown San Jose would add another **7 stations** and generate about **49,000 more riders** each week-day. The **entire 19.4 mile, 9 station extension** from Fremont to San Jose would **add about 60,000 to 65,000 new BART trips** each weekday by the year 2000.

Peninsula-West Bay: Lying in San Mateo and Santa Clara counties, this is a well-defined narrow travel corridor traversed by I-280 and US-101. These are heavily used and parallel freeways which are generally within five miles of one another. San Mateo County constitutes the northern two-thirds of the corridor. This county is densely developed, and has experienced a relatively high rate of employment growth. It is in this part of the Peninsula Corridor that the Bay Area's principal airport, San Francisco International, is located. The southern third of the corridor, in Santa Clara County, has had extremely high growth in population and employment, which has been catapulted by the emergence of Silicon Valley. The corridor has a long history of rail transit and is today served by 26 weekday Caltrain departures in each direction between San Francisco and San Jose. Ridership for this service is just under 16,000 weekday trips. A **6.5 mile BART extension** to San Francisco Airport would **add 3 stations** and is projected to generate about **55,000 weekday trips** in the year 2000. The full **40.5 mile extension** to San Jose would **add 19 stations** south of Daly City and would generate on the order of **117,000 weekday trips** in the year 2000.

CHAPTER TWO:

BART SERVICE DELIVERY

- BART Service. . .From Design To Delivery
- Setting Service Standards
- Delivering Better And More Service

CHAPTER TWO REFERENCE GUIDE

BART SERVICE DELIVERY

HIGHLIGHTS

- BART's challenge for service delivery is to expand capacity without compromising service reliability.
- The strategy for delivering quality service is based on adherence to stringent preventative maintenance and performance standards.
- Key programs which assist BART in meeting its service delivery objectives are the Load Factor Monitoring Program and Delay Monitoring Program.
- More reliable vehicle, wayside, and central train computer components, along with effective management of service delays, will enable BART to make full use of the Capacity Expansion Program.
- The system's maximum service frequency will be increased 53%, from the current 17 trains per hour in one direction to 26 per hour by September 1990. Supporting this will be a 35% increase in the number of cars in service, forming 22% more trains relative to today.
- Other important aspects of service BART will continue to focus on include availability of escalators, elevators, and other vital station equipment; maintaining a safe and secure operating environment; providing quality express bus service; expanded parking and improved coordination with feeder transit; and working toward realizing system extensions.

PERFORMANCE INDICATORS

- Car availability
- Service delays
- Car throughput (Key)
- Load factors
- Patron ontime (Key)
- Patron accident rate
- AFC incident rate (Key)
- Elevator availability
- Escalator availability
- Express bus ontime

REFERENCE DOCUMENTS

- BART Composite Report, P.B.T.&B. (1961)
- BART Maintenance Program (1988)
- BART Quarterly Operations Performance Report
- 1987 Bay Area Council Survey
- Caltrans TIP (1987)

Progress for BART means **delivering quality transit service.** This requires the continuation of effective programs which guide efforts for system operations, maintenance, and expansion. BART ridership has been shown to be sensitive to both service quality and quantity. Accordingly, BART's top priority is to continue to achieve high performance standards. Following from this, BART's challenge is the timely implementation of essential programs and capital improvements which will allow for more and better service to be provided. This includes the near-term challenge to complete the Capacity Expansion Program and phase in higher frequency service without compromising safety or reliability, and improving system access by providing more parking and better coordination for connecting transit. Longer-term challenges for BART lie primarily in the areas of joint development and extensions, with interim progress marked by the achievement of key milestones for each of these programs.

BART SERVICE. . .FROM DESIGN TO DELIVERY

From the mid-1940s to the mid-1950s, urban travel patterns and habits changed dramatically. Automobile travel eroded transit use and opened new markets not served by transit. Highway use and capacity grew rapidly to the point that additional highway expansion seemed undesirable. Transit's key supporting role began to emerge, but the travel market had become much more competitive.

To attract riders to transit, **BART's designers sought to emulate the performance and comfort of the automobile.** This included the provision of wide and plush seating, climate-controlled and well-lighted interiors, and high speeds. Improved suspension, propulsion, and control systems represented a new level of transit performance. In practice, however, the promise offered by the newly designed system took a bit longer to be realized.

Train control and car component problems plagued BART for much of the 1970s. During this time, BART developed a comprehensive program of performance monitoring, with particular emphases on service reliability and capacity. Events in the 1970s also ushered in an effort which is known today as BART's Capacity Expansion Program. Additionally, BART's focus on service quality gave rise to three key indicators for tracking important aspects of system performance as perceived by customers. These are: peak period transbay **car throughput, patron ontime** performance, and automatic fare collection **(AFC) equipment incident rate.** The first indicator measures the delivery of scheduled capacity. The second measures the delivery of customers versus the published train timetable. The third measures performance of vital station equipment.

By the end of the 1970s, BART's train operations had improved significantly because of three key programs. BART's **Reliability Improvement Program** produced vehicle modifications which greatly improved car performance. Also, a backup train protection system, which was sought by the California Public Utilities Commission (CPUC), provided the assurance of operating safely at greater frequency. Further, conversion of 35 excess A-cars to B-cars greatly improved fleet utilization and available capacity. These improvements made possible the expansion of BART service in July 1980. Direct service started between Richmond and San Francisco; minimum headways were reduced from 6 minutes to 3 minutes 45 seconds. This resulted in a 60% increase in service with 16 trains able to cross the Bay in the primary demand direction in the peak hour. More recently, completion of the **Vehicle Fire Hardening Program** in August 1986 made possible the addition of two more trains to peak period transbay service, with 17 in the peak hour. This brought the maximum number of trains on line during the rush period to 45.

SETTING AND ACHIEVING SERVICE STANDARDS

Evolution of BART service and the annual policy review process has increasingly focused on service delivery issues. The first three goals in Figure 2 established the context for BART rail service. Experience to date, as well as District market research, indicates that BART **passengers place a high value on consistently reliable service.** BART's three key performance indicators reflect this concern.

*** Production of Service ***

The delivery of scheduled capacity depends on two factors. First, cars must be maintained to high standards and made available to form trains. Second, once placed in service, trains must perform as scheduled, delivering the capacity to meet customer demands. This is especially critical during peak travel periods when virtually all of BART's available cars are pressed into service.

This emphasis has resulted in the emergence of **peak period transbay car throughput** as one of BART's key performance indicators for service delivery. Car throughput is expressed as a percent and measures the number of cars making the transbay crossing in the primary demand direction during the peak period versus those scheduled. This, in essence, is one of the "bottom line" service delivery indicators which **reflects overall performance for both maintenance and operations.** Achievement of favorable performance with respect to **car availability** and **service delays** support efforts to deliver adequate capacity. This, in turn, is reflected by customer crowding on trains as measured by **load factors.**

Figure 11 presents actual peak period transbay car throughput for the past five years by quarter. As shown, performance has been consistently above 96% except for the first three quarters of FY 1985/86 when construction for the KE Track and Daly City Turnback had an impact on mainline operations. With completion of work on these projects, car throughput returned to more favorable levels which, for the most part, lie between 97.0% and 97.5%. **BART's objective for this key indicator is to achieve 97.5% peak period transbay car throughput in FY 1988/89 and during the four following years as capacity and service frequencies are increased.**

*** Delivery of Service ***

Automated faregate and train history information systems enable BART to measure the percentage of riders delivered on time to their destination station relative to scheduled train run times. **Patron ontime performance** is another key indicator for service delivery, one which reflects overall train performance and the proportion of customers affected by service delays.

Figure 12 presents levels achieved for patron ontime performance for the past five years by quarter. As for car throughput, construction for the KE Track and Daly city Turnback had an unfavorable impact on patron ontime performance in FY 1985/86. Before mid-1985, patron ontime averaged between 92% and 94%.

Figure 11

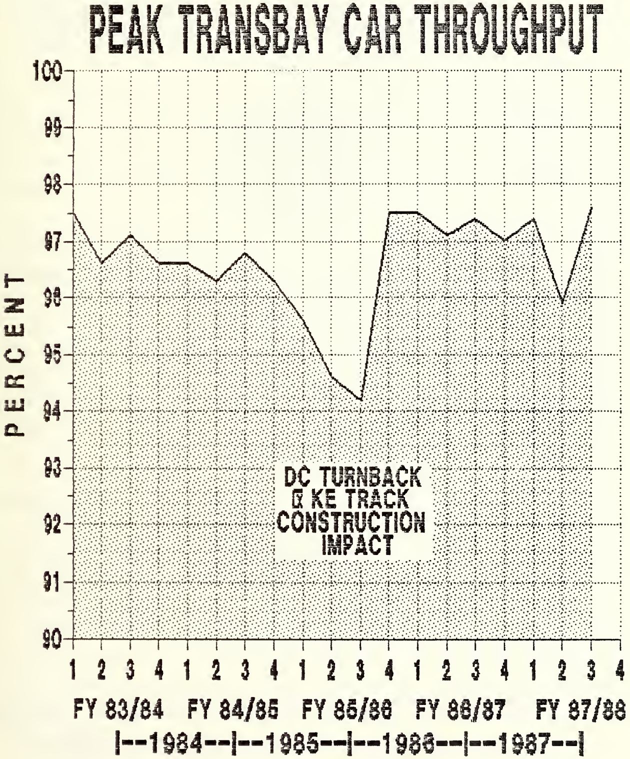
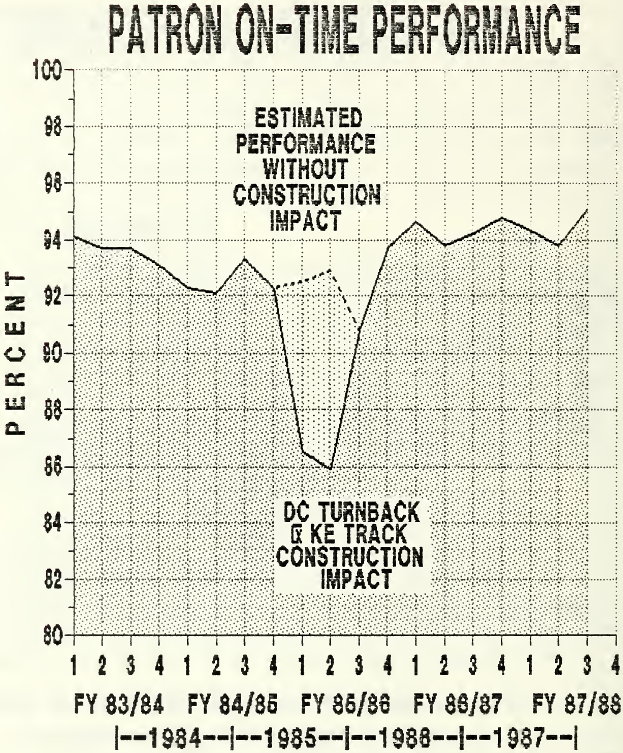

PEAK TRANSBAY CAR THROUGHPUT
PERCENT
100
99
98
97
96
95
94
93
92
91
90
DC TURNBACK
& KE TRACK
CONSTRUCTION
IMPACT
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 83/84
FY 84/85
FY 85/86
FY 86/87
FY 87/88
|--1984--|--1985--|--1986--|--1987--|

Figure 12


PATRON ON-TIME PERFORMANCE
ESTIMATED PERFORMANCE WITHOUT CONSTRUCTION IMPACT
DC TURNBACK & KE TRACK CONSTRUCTION IMPACT
PERCENT
100
98
96
94
92
90
88
86
84
82
80
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 83/84
FY 84/85
FY 85/86
FY 86/87
FY 87/88
|--1984--|--1985--|--1986--|--1987--|

During the construction period, performance dipped to about 86%, reflecting mainline service interruptions and slower train speeds. After work was completed for the KE and Turnback, patron ontime performance rebounded and has held between 94% and 95%. This compares favorably to BART's **94% patron ontime performance objective** which has been retained for the current five-year period.

*** Vital Station Equipment ***

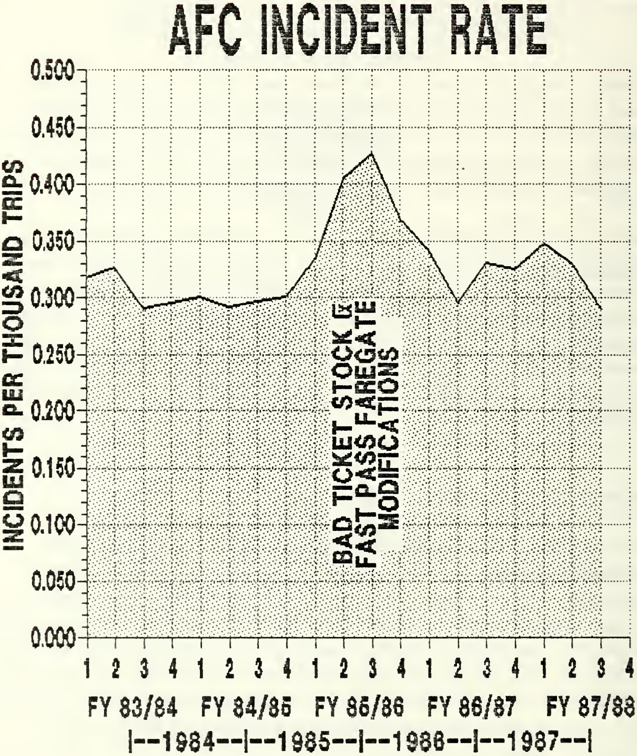
Ticket, faregate, and other AFC equipment must perform to high standards in order to maintain unimpeded customer flows entering and exiting stations. BART's third and last key performance indicator for service delivery focuses on this. The **AFC incident rate** reflects the proportion of customers affected by equipment problems which cannot be corrected by station agents.

BART's objective since FY 1982/83 has been to **maintain an AFC rate of 0.30 incidents per 1,000 trips.** This standard has been retained for the current five-year period. Actual performance for the past five years by quarter is presented in Figure 13. The 0.30 standard has been achieved for seven of the quarters shown. Defective ticket stock and modifications made to faregates to accept multi-operator passes have resulted in unfavorable performance, mainly in FY 1985/86. Since then, the AFC rate has fluctuated between 0.30 and 0.35 incidents per 1,000 trips.

DELIVERING BETTER AND MORE SERVICE

Service delivery improvements depend upon the timely implementation of programs and capital projects. A cornerstone for this effort is BART's Capacity Expansion Program. According to the Bay Area Council's annual survey, **transportation is the most frequently cited regional problem.** Highway congestion is worsening. Growth of new downtown-oriented peak period travel is likely, given current and projected office expansion plans in San Francisco and Oakland. Significant expansion of highway capacity, especially during the next few years in the transbay and other key corridors, will not occur. Programmed highway reconstruction for I-80, I-680, and I-880 is expected to

Figure 13


AFC INCIDENT RATE
INCIDENTS PER THOUSAND TRIPS
0.500
0.450
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
BAD TICKET STOCK &
FAST PASS FAREGATE
MODIFICATIONS
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 83/84
FY 84/85
FY 85/86
FY 86/87
FY 87/88
|--1984--|--1985--|--1986--|--1987--|

result in increased traffic congestion and a shift to BART usage as these long-term highway improvements require lane closures over the next several years. The BART Capacity Expansion Program is designed to address this need, especially in the transbay corridor.

For the Capacity Expansion Program to be fully effective, however, will require the implementation of BART's **Capital Improvement Program.** Projects contained in this program (see Figure 14) are in direct support of achieving high performance standards and realizing projections for ridership and revenue. The delivery of this program is, therefore, essential for capacity expansion, improved access, extensions, and for maintaining and improving all other functional aspects of the 71-mile basic system. Details of how BART will increase service and the projects needed for this to occur are presented in the following sections by program area. Keeping within this chapter's focus, the discussion is presented mainly within the context of the first program area, capacity and reliability. Additional information for capital projects is contained in BART's 1988 Five Year **Capital Improvement Program,** which is under separate cover.

*** Capacity and Reliability ***

BART's strategy for delivering high quality service is based on adherence to stringent preventative maintenance procedures and standards. This, in concert with a comprehensive program for monitoring performance, will continue to allow BART to provide adequate capacity when and where needed. Achieving favorable performance with respect to BART's three key service delivery indicators (i.e., car throughput, patron ontime, and AFC performance) will require concentrated efforts for a number of supporting functions. This will become especially important as headways are reduced and more trains are placed in service.

Maintenance shops will need to **maintain 4 a.m. car availability of 85% for A- and C-Cars and 90% for B-cars.** This is critical for having a sufficient number of vehicles to form all scheduled trains with enough seated capacity to accommodate demand.

Figure 14

1988 CAPITAL IMPROVEMENT PROGRAM, PROJECT SUMMARY

BASIC SYSTEM PROJECTS	FMS NO.
1. Train Operator Break Room Modifications, 3 Yards	(01RM) (03PM) (05NF)
2. Consolidate Component Repair Shop	(01SO)
3. Canopy Storage Shed, Hayward Yard	(01ST)
4. Replace West Entrance Gates, Richmond Station	(05LB)
5. Replace PCB Transformers, San Fransico Vent	(09FE)
6. Emergency and Patron Stairways, Embarcadero Station	(11FG)
7. Fire Department Connections, 21 Stations	(15AZ)
8. Rail Replacement	(15CL) (15CM)
9. Escalator Rehabilitation	(15LC)
10. Underground Storage Tank Monitor	(15SA)
11. Eleminate Station Interfaces	(20AC)
12. Station Backup Power	(20HB)
13. Yard Efficiency Modifications, ACI System Improvements	(21EB)
14. Automatic Protection and Battery Backup	(27BC)
15. RADCOM	(27OC)
16. Coupler Pins and Solenoid Valves	(41EM)
17. Multi-Denominational Bill Validators	(45AN)
18. IBM Ticket Transport Retrofit	(45BF)
19. IBM Faregate Fans, AC/BART Plus Ticket	(45BN)
20. Cubic Faregate Mods, AC/BART Plus Ticket	(45CK)
21. 9 Ticket Vendors and 8 Addfare Machines	(47BA)
22. Platform Train Schedule Signs	(59CK)
23. Station Platform Signing Mods, MacArthur Station	(59CM)
24. RTA Information Centers, Areawide	(59DD)
25. 4 Tractor Trailer Armored Trucks	(68DE)
26. Replacement Maintenance Equipment, Miscellaneous	(79--)
27. Replacement Overage Sedans/Maintenance Vehicles, Misc.	(79B-)
28. New Vans and Pickup Trucks	(79AC) (79AD)
29. New High-Rail Vehicles	(79DA)
30. Vacuums and Scrubbers	(79IV)
31. Portable Radios, Train Operators	(79LC)
32. Rail Grinder	(79MP)
33. Inventory Buildup	(93DP)
34. C-Car Startup	(99*73)
35. System Performance Study Justified Projects	(99*75)
36. Daly City Turnback Reserve Over-run	(99*77)
37. System Performance Study, Phase II	(99*80)
38. System Safety Upgrade, Phase III	(99*15)
39. Land and Land Rights	(99*50)
40. Agency and Utility Agreements	(99*51)
41. Other Costs; Insurance, Bond Agents, etc.	(99*52)
42. Outstanding Claims	(99*54)
43. Project Development	(99*55)
44. Planning and Joint Development	(99*56)
45. Joint Development Infrastructure Improvements	(99*59)
46. Improvement Allowance	(99*66)
47. Entrance Canopies	(99*84)

CAPACITY EXPANSION PROJECTS	FMS NO.
1. Daly City Turnback and Yard	(11--)
2. Daly City Initial Shop Facilities	(11TD)
3. Electrical Capacity Improvements	(15EG)
4. Wayside Train Control and System Performance Mods	(20--)
5. Second Generation ATO, 136, A-Car Sets	(41GB)
6. C-Car Procurement Specifications	(42AA)
7. Integrated Control System, ICS	(61--)
ACCESS IMPROVEMENT PROJECTS	
1. Parking Facility, 435 Spaces at Lake Merritt Station	(01EE)
2. Park/Ride Facility, 100 Spaces in Alameda	(01GG)
3. Parking Facility, 859 Spaces at Fruitvale Station	(01GH)
4. Parking Facility, 844 Spaces at Bay Fair Station	(01MH)
5. Parking Expansion, 296 Spaces on Atherton Site at Hayward Station	(01OF)
6. Parking Structure, 950 Spaces at Hayward Station	(01OG)
7. Satellite Parking, 500 Spaces for Union City Station	(01VG)
8. Parking Facility, 500 Second Deck Spaces at Rockridge Station	(03EB)
9. Parking Facility, 500 Spaces at Orinda Station	(03HG)
10. Parking Facility, 700 Spaces at Lafayette Station	(03JG)
11. Parking Facility, 1,132 Spaces at Walnut Creek Station	(03LG)
12. Parking Facility, 1,200 Spaces (Expansion) at Pleasant Hill St.	(03NE)
13. Parking Facility, 1,200 Spaces (Replacement) at Pleasant Hill St.	(03NG)
14. Additional Platform Stairway, Concord Station	(03RB)
15. Parking Facility, 900 Spaces (Phase II) at Concord Station	(03SH)
16. Parking Facility, 1,385 Spaces (Phase I) at Concord Station	(03SN)
17. Park/Ride Facility, 100 Spaces in Brentwood	(04RA)
18. Parking Facility, Virginia Street in North Berkeley	(05GB)
19. Parking Facility, 1,200 Spaces (Phase II) at El Cerrito del Norte	(05KH)
20. Parking Facility, 1,200 Spaces (Phase I) at El Cerrito del Norte	(05KI)
21. Parking Lot Completion, West End at Richmond Station	(05MD)
22. Parking Facility, 912 Spaces at MacArthur Station	(07GH)
23. Parking Facility, 900 Spaces at Oakland West Station	(11EG)
24. Replacement Parking, 270 Spaces at Oakland West Station	(11EH)
25. Daly City Intermodal Facility, Preliminary Engineering	(11UB)
26. Self Operating Elevator Improvements, E & H Mods	(15NG)
27. Parking Productivity Improvements, 1,942 Spaces	(0--&)
EXTENSION PROJECTS	
1. Fremont-South Bay Study	(02AC)
2. Pittsburg-Antioch Phase I, EIR and Preliminary Engineering	(04AC)
3. Highway 4 Willow Pass Grade Mods	(04CB)
4. Park/Ride Lot, 200 Spaces at Railroad Avenue	(04IA)
5. Park/Ride Lot, 200 Spaces at Somersville Road	(04KA)
6. Park/Ride Lot, 200 Spaces (Phase I) at Hercules	(06KA)
7. Livermore-Pleasanton, Planning	(08AB)
8. Bus Transfer and Park/Ride Lot, West Livermore	(08KA)
9. Right-of-Way Acquisition	(0-B-)
10. Irvington, Warm Springs Extension	(02--)
11. North Concord, Pittsburg- Antioch Extension	(04--)
12. Castro Valley, Livermore-Pleasanton Extension	(08--)
13. San Francisco Extension Project	(99*79)

Once trains are dispatched, **adherence to schedule is paramount.** When delays occur, how effectively they are managed will determine the rate of service recovery. Analysis of factors which cause delays have helped BART to identify needed corrective actions and fall-back operational strategies for minimizing service interruptions. BART has consistently achieved its objectives for delay incidents and delayed trains since mid-1986. Since closer headways will require even better delay management, the delay threshold has been made more stringent, decreasing from 7 to 5 minutes. Directly in support of car throughput and patron ontime performance, BART will strive to provide service **such that no more than 3% of peak period trains experience a primary delay exceeding 5 minutes and no more than 8% experience a delay exceeding 5 minutes from any cause.**

Provision of an adequate number of cars and effective delay management will enable BART to control passenger loadings. This is measured by train load factors which are expressed as the ratio of on-board passengers to seats (see Figure 5 in Chapter One). The policy regarding **load factors** has been revised this year, from one based on balancing peak train loads (under conditions of not having additional cars) to one based **on achieving a 1.00 average** peak train load factor for those consists BART can alter (as determined by the 3-car minimum and 10-car maximum train lengths). BART's policy for offpeak service is not to exceed a 1.00 load factor on average. The addition of C-cars to the operating fleet will permit scheduling longer trains beginning in mid-1988. This will lower train load factors somewhat, for those consists which are not already at their 10-car maximum. Load factors are not expected to be reduced significantly, however, until additional trains can be placed in service starting in January 1989. The plan for acomplishing this and supporting analysis are as follows.

The goal of BART's Capacity Expansion Program is to reduce minimum allowable headways, thereby permitting more trains to be placed in service. Projects required to achieve or support each successive headway reduction are identified in Figure 15 together with their respective completion dates (as of September 30, 1987; the 1988 financial plan update is based on these dates). The target dates reflect current plans for capital project implementation. However, these may be altered by funding limitations or changes necessary for smooth implementation.

FIGURE 15

BART CAPACITY EXPANSION PROGRAM

5/16/88

Minimum Headway Capability (Min:Sec)	Projects Required To Achieve or Support This Headway	Anticipated Project Completion Dates	Target Expanded Service Start Dates	Peak Hour Trains Peak Direction Transbay	Peak Period Capacity Trains		On-Line Cars	Spare Cars	Total Cars Required	Available Fleet A/C-Cars @85% B-Cars @90% (Extra)	Operating Fleet Size	
3:45 (except for 3:00 during peak 15 minutes)	Current Service	---	Nov 86	17	45	A B T	90 248 338	16 24 40	106 272 378	114 (+8) 272 386 (+8)	134 303 437[d]	A B T
	Delivery of 48 C-Cars	Aug 88	Sep 88[f]	17	45	A C B T	80 40 248 368	16 0 24 40	96 40 272 408	114 (+18) 40 272 426 (+18)	135 48 303 486	A C B T
3:10	Daly City Turnback	Nov 88	Apr 89[f]	19	51[e]	A C B T	100 61 234 395[e]	14 6 37 57	114 67 271 452	114 81 (+1) 272 (+1) 467 (+2)	135 96 303 534	A C B T
	Delivery of 48 Additional C-cars (96 total)	Mar 89										
2:30	New On-Board ATC (A-Car Retrofit)	Jan 89										
	Daly City Yard	Apr 89										
	M-87 Interlocking	Jul 89										
	Wayside Train Control/System Performance Mods	Jul 89										
	Delivery of 54 Additional C-Cars (150 total)	Oct 89										
	Electrical Capacity Increase: - Procure/Install Substation	Jun 90	Jul 90[f]	23[g]	52[g]	A C B T	72 114 230 416[g]	8 12 42 62	80 126 272 478	114 (+34) 128 (+2) 272 514 (+36)	135 150 303 588	A C B T
2:15	Brake Rate Algorithm Modifications	Jun 90	Dec 90[f]	26[h]	55[h]	A C B T	91 120 230 441[h]	14 6 42 62	105 126 272 503	114 (+9) 128 (+2) 272 514 (+11)	135 150 303 588	A C B T

d. Status as of March 31, 1988; reflects 2 A-cars in use as engineering test vehicles.

e. Reflects addition of 3 trains and 13 cars on-line during peak period; also includes 3 extra trains comprised of 18 cars and required for operation of Daly City Turnback (prior to system resignaling) which do not increase actual capacity during regular peak cycle.

f. This start date reflects information only recently available and is three to four months after the date assumed when costing and service update estimates were prepared (November 1987-February 1988). Information elsewhere in the draft plan which is based on the earlier dates will be revised in the final plan document.

g. Reflects addition of 4 trains and 45 cars on-line during peak. Requirement for 3 trains i the turnback is offset by resignaling.

h. Reflects 3 trains and requirement for 20 additional cars in December 1990 with start of 2:15 headways. By the fifth year (FY 92/93), total cars required would exceed those available by 4 vehicles.

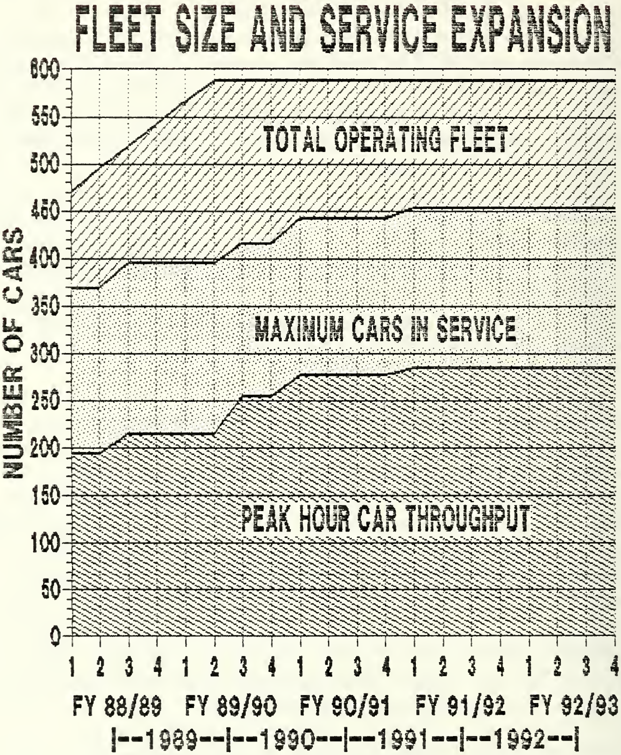
BART's strategy for implementing the new service reflects lessons learned from previous service increments. New service will be phased in increments to avoid reducing existing service quality standards. For example, work on the M-87 area near Daly City Station during FY 1988/89 is expected to impact service. Steps are being taken to minimize the impact. **Service changes will be implemented carefully and programmed in advance** to anticipate and ameliorate, as much as possible, service disruptions due to the transition to higher service levels. Wherever possible, full-scale or computer-based simulations will be carried out beforehand to test and verify that changes will not degrade current service levels.

Each higher service level is characterized by the number of peak hour, peak direction transbay trains, the total number of peak period trains and cars on line, spare car requirements, and total cars required. Projected availability figures are shown for comparison purposes. As shown in Figure 15, **four service increments are planned for implementation during the five year period** as completion of supporting capital projects permits.

Current BART service is at capacity in terms of effective peak period use of available B-cars. Although additional A-cars are available, any new trains would require taking B-cars from already scheduled consists. The C-car project will add 150 vehicles to BART's fleet, the impact of which is reflected by the fleet size as shown in Figure 16. According to current plans, all available vehicles including the C-cars will be in service as of FY 1991/92. Expansion of service capacity beyond this level will require the **acquisition of additional rolling stock.** Planned service increments reflect estimated requirements based on current demand projections. Should these requirements change prior to start-up dates, service increments will be modified accordingly. (In addition to the major projects identified in Figure 15, other important projects needed to support service delivery efforts are listed in the Capital Improvement Program.)

The peak hour demand projections updated in this plan assume that existing trains will be lengthened where possible in response to increased ridership before adding trains. There are two reasons for this. Operating additional peak hour transbay trains is not possible until headways are reduced to 3

Figure 16


FLEET SIZE AND SERVICE EXPANSION
NUMBER OF CARS
600
550
500
450
400
350
300
250
200
150
100
50
0
TOTAL OPERATING FLEET
MAXIMUM CARS IN SERVICE
PEAK HOUR CAR THROUGHPUT
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 88/89 FY 89/90 FY 90/91 FY 91/92 FY 92/93
|--1989--|--1990--|--1991--|--1992--|

minutes 10 seconds in January 1989. Also, trains in the balance (or "shoulder") of the peak generally have lower load factors and capacity to accommodate more cars.

Additional trains are programmed, as headway reductions permit, when trains reach the 10-car limit and demand exceeds the load factor policy. Under this approach, most of the planned additional trains are targeted for the most heavily traveled routes. This allocation strategy has generally been the basis for previous plans. Current budget constraints support this rationale.

Allocation of additional capacity among the four routes will depend on a number of factors. Chief among these is the volume of existing and projected ridership. Current and anticipated patronage estimates for the three transbay routes are shown in Figure 8. Ridership on the fourth route, Richmond/ Fremont, is well below that of the transbay routes and significant additional capacity is not expected to be required.

All of the above factors have been considered in developing the proposed allocation of future service increments among BART's four routes. Planned additional trains and cars are indicated by route in Figure 17 together with existing service. The proposed plan calls for **increasing the number of trains on line from 45 now to 55** by September 1990, as shown in Figure 18. This will be accomplished in four increments as follows:

By July 1988: Availability of a portion of the C-cars will permit **lengthening of some currently scheduled trains.** The first increment involves the addition of 27 cars to the available operating fleet as of July 1988, based on the projected C-car procurement schedule. Opportunities for reducing discretionary train load factors to 1.00 exist on all four routes.

By January 1989: Minimum headways will be reduced to 3 **minutes 10 seconds,** and the addition of 6 more trains will bring the total online to 51. Three of these trains, however, reflect the need to operate one more train on each of the three transbay routes in order to maintain headways in and out of the Daly City Turnback. This results in a **net increase in capacity of 3 trains.** This

Figure 17

PROJECTED PEAK PERIOD ONLINE REQUIREMENTS: TRAINS AND CARS

	SERVICE START DATE AND MINIMUM SCHEDULED HEADWAY (Min:Sec)					
	JUL 1988	JAN 1989	MAR 1990	SEP 1990	JUL 1991	JUL 1992
	3:45	3:10	2:30	2:15	2:15	2:15
TRAINS ONLINE						
PEAK 60 MINUTES						
Concord/Daly City	7	8	10	11	11	11
Fremont/Daly City	6	7	8	9	9	9
Richmond/Daly City	4	4	5	6	6	6
Transbay	17	19	23	26	26	26
Fremont/Richmond	5	5	5	5	5	5
System	22	24	28	31	31	31
BALANCE OF PEAK PERIOD						
Concord/Daly City	8	9	9	9	9	9
Fremont/Daly City	5	5	5	5	5	5
Richmond/Daly City	5	5	5	5	5	5
Transbay	18	19	19	19	19	19
Fremont/Richmond	5	5	5	5	5	5
System	23	24	24	24	24	24
TOTAL PEAK PERIOD						
Concord/Daly City	15	17	19	20	20	20
Fremont/Daly City	11	12	13	14	14	14
Richmond/Daly City	9	9	10	11	11	11
Transbay	35	38	42	45	45	45
Fremont/Richmond	10	10	10	10	10	10
System	45	48	52	55	55	55
CARS ONLINE						
PEAK 60 MINUTES						
Concord/Daly City	70	80	100	109	110	110
Fremont/Daly City	60	70	80	89	90	90
Richmond/Daly City	40	40	49	54	59	59
Transbay	170	190	229	252	259	259
Fremont/Richmond	24	24	25	25	26	26
System	194	214	254	277	285	285
BALANCE OF PEAK PERIOD						
Concord/Daly City	74	77	69	70	71	71
Fremont/Daly City	41	43	38	38	39	39
Richmond/Daly City	44	46	40	41	42	42
Transbay	159	166	147	149	152	152
Fremont/Richmond	15	15	15	15	15	15
System	174	181	162	164	167	167
TOTAL PEAK PERIOD						
Concord/Daly City	144	157	169	179	181	183
Fremont/Daly City	101	113	118	127	129	131
Richmond/Daly City	88	86	88	95	101	101
Transbay	329	356	376	401	410	410
Fremont/Richmond	39	39	40	40	41	41
System	368	395	416	441	452	452
SPARE CARS	40	57	62	62	62	62
TOTAL REQUIREMENT	408	452	478	503	514	514

Figure 18

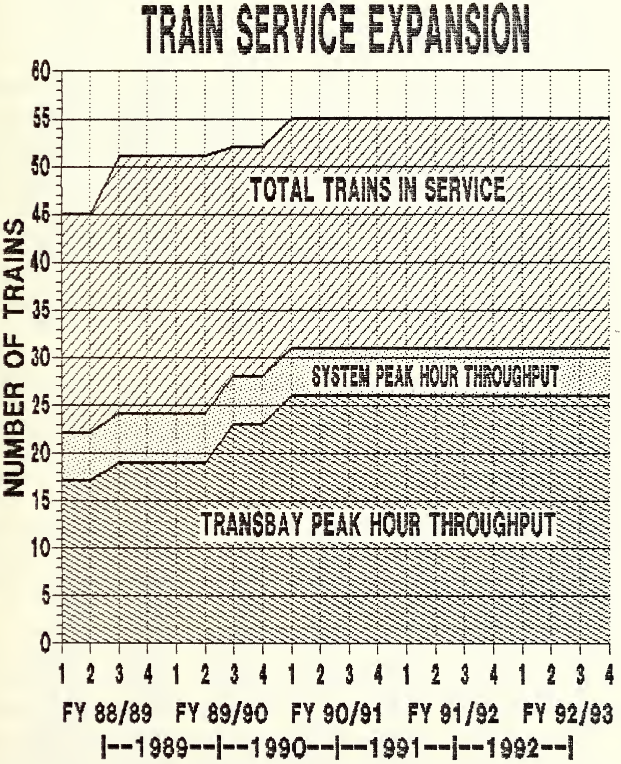
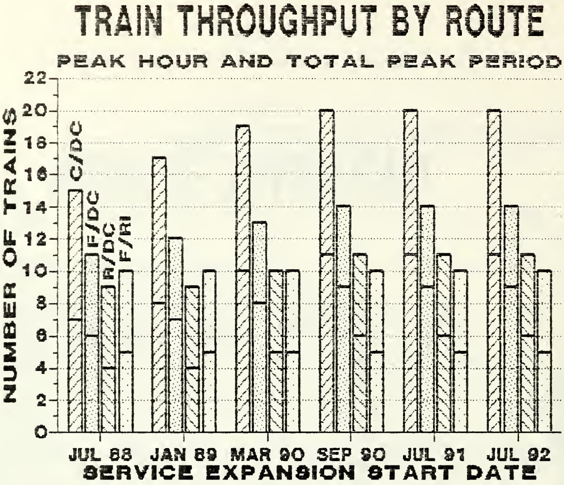
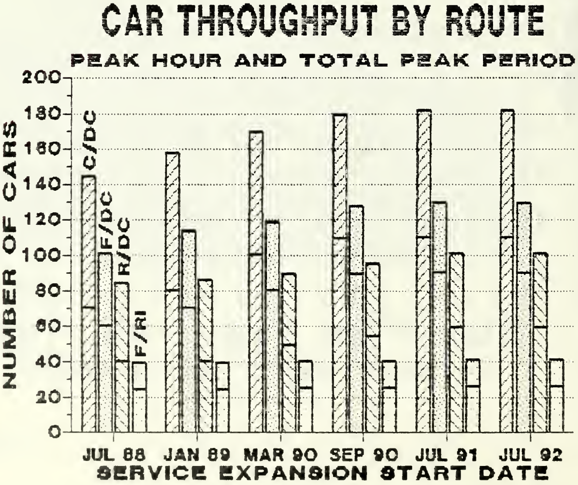

TRAIN SERVICE EXPANSION
NUMBER OF TRAINS
60
55
50
45
40
35
30
25
20
15
10
5
0
TOTAL TRAINS IN SERVICE
SYSTEM PEAK HOUR THROUGHPUT
TRANSBAY PEAK HOUR THROUGHPUT
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 88/89
FY 89/90
FY 90/91
FY 91/92
FY 92/93
|--1989--|--1990--|--1991--|--1992--|

Figure 19


TRAIN THROUGHPUT BY ROUTE
PEAK HOUR AND TOTAL PEAK PERIOD
NUMBER OF TRAINS
22
20
18
16
14
12
10
8
6
4
2
0
C/DC
F/DC
R/DC
F/RI
JUL 88
JAN 89
MAR 90
SEP 90
JUL 91
JUL 92
SERVICE EXPANSION START DATE


CAR THROUGHPUT BY ROUTE
PEAK HOUR AND TOTAL PEAK PERIOD
NUMBER OF CARS
200
180
160
140
120
100
80
60
40
20
0
C/DC
F/DC
R/DC
F/RI
JUL 88
JAN 89
MAR 90
SEP 90
JUL 91
JUL 92
SERVICE EXPANSION START DATE

headway reduction will permit the addition of two trains to transbay service in the peak hour. Based on anticipated demand, one new train is proposed for both the Concord and Fremont/Daly City routes. Additionally, maintenance of the 1.00 load factor on discretionary trains during the balance of the peak cycle is expected to require one more "shoulder-period" Concord train. Concurrent with this service increment, the spares requirement for peak service will be increased by 17 cars in recognition of longer train lengths.

By March 1990: Minimum headways will be reduced to **2 minutes 30 seconds** and one additional train will be put in service for a total of 52 online. Completion of system resignaling will increase operating speed enough to eliminate the 3-train Daly City Turnback requirement noted above for the previous service increment. This will effectively result in a **net capacity increase of 4 trains** for this service level. Current plans are to add additional peak hour trains on each of the three transbay routes. Car requirements are expected to grow by 23 vehicles which will be allocated to all four routes, as indicated in Figure 17. An increase in the spares requirement of 5 vehicles is also planned to support this service level based on longer train lengths.

By September 1990: Minimum headways will be reduced to **2 minutes 15 seconds,** and **3 more trains added** for a total of 55 on line. The ridership forecast and load factor policy call for three additional peak hour transbay trains. With this service increase, 25 more cars will be added to peak period trains, bringing car requirements for operations to 503. This is only 11 cars less than the total available. Projected ridership growth in the final two years of the current planning period is anticipated to require all 11 of these cars plus some additional vehicles. Note in Figure 17 that, with 55 trains in service, all 514 available cars are expected to be utilized by FY 1991/92.

*** Safety ***

Safety considerations are addressed by BART's Safety Department which oversees all aspects of operations. Incidents of customer accidents are closely monitored and analyzed, and appropriate actions taken to minimize their occurrence. BART's objective for the current five-year period is to **continue to provide an environment for patron circulation within stations and in trains such that accident rate does not exceed 17.7 per million passengers.** Stringent adherence to industry-accepted standards will assure that more people riding more trains is, above all, safe. Additional stairways at Embarcadero Station is one example of an improvement to safely accommodate higher passenger volumes.

*** Access ***

One major thrust of BART's access program is increasing station parking. This is reflected by the fact that 24 out of 27 of the projects identified in the Access Improvements section of BART's 1988 Capital Improvement Program are for additional parking. The strategy for supporting service expansion and accommodating increased ridership is to deliver these projects which are summarized in Figure 14. Based on the implementation schedules for these projects, programmed parking space additions are as shown in Figure 10.

Improved transit access is programmed for BART express bus operations as well as more coordinated service between BART and other Bay Area operators. These were discussed in the Access Section in Chapter One. Realization of these improvements will largely depend upon the availability of adequate funding and the ability of the various operators to implement their respective programs.

In support of maintaining internal accessibility and unimpeded flows within stations for increasing numbers of customers, **elevators and escalators will be maintained to achieve 96% availability.** This supports similar efforts for AFC equipment, as already discussed under Vital Station Equipment in this chapter.

*** Human Resources ***

Delivery of BART's capital program and the service it supports depend upon human resources to realize progress. BART will continue to develop its workforce for this purpose. Additional emphasis wil be given to **customer service,** which will reflect how business is conducted at all levels.

*** Marketing ***

Marketing efforts will be carried out independently and in concert with the RTA. BART will aggressively seek to stimulate demand for peak and offpeak travel. The lead will continue to be BART's department of Public Affairs as supported by the department of Planning, Budget, and Research.

*** Joint Development ***

Progress for joint development will depend upon market conditions and BART's effectiveness to achieve interim milestones for long-term projects. The FY 1988/89 program objectives for joint development reflect this (see Figure 2).

*** Extensions ***

Funding will largely determine the timing for extension projects. Details for financial requirements and other considerations for realizing system extensions are contained in BART's 1988 Capital Improvement Program. BART will continue to develop its extensions program and advocate implementation in accordance with the policy adopted by the BART Board of Directors (see Figure 20).

Figure 20

BART EXTENSION STAGING POLICY

(The several segments shown under each Roman numeral are understood to be implemented concurrently, to the extent that funding is available.)

(BART will be the operator for any new heavy or light rail transit starts or extensions within the three BART counties except for those projects developed by existing rail transit operators.)

	INSIDE CURRENT DISTRICT		OUTSIDE CURRENT DISTRICT (Subject to a satisfactory cost-sharing arrangement and parallel construction within the District.) ***
I.	North Concord/West Pittsburg Irvington/Warm Springs Castro Valley/Dublin MUNI Metro Extension Project*	I.	Colma/Tanforan/San Francisco Airport Milpitas
II.	Pittsburg/West Antioch/East Antioch Pleasanton/West Livermore/East Livermore San Francisco ** San Pablo/Hilltop Oakland Airport Connector	II.	Millbrae - Menlo Park Milpitas - San Jose
III.	San Francisco ** Pinole/Hercules San Ramon Corridor	III.	San Jose - Menlo Park

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* The San Francisco Project is identified through coordination with the City and County of San Francisco as the MUNI Metro Extension to the CALTRAIN Depot South of Market.

** Specific San Francisco Project to be identified through coordination with the City and County of San Francisco. Section 29034.5 of the California Public Utilities Code Lists an extension of District services and facilities to the northwest section of the City and County of San Francisco as a District service commitment.

*** Pursuant to Section 29034.5 of the California Public Utilities Code, only non-District funds may be spent by the District for the purpose of extending services and facilities outside of District's January 1, 1971 boundaries until the District meets specified service commitments within the 1971 boundaries.

Board adopted September 1, 1983; Board amended February 2, 1984;
Board amended October 23, 1986; Board amended May 14, 1987.

CHAPTER THREE:

PRODUCTIVITY AND EFFICIENCY

- People Make The Difference
- Putting Knowledge To Work
- Acting On Opportunities

CHAPTER THREE REFERENCE GUIDE

PRODUCTIVITY AND EFFICIENCY

HIGHLIGHTS

- Improving productivity is contingent upon keeping operating costs in line relative to revenue growth from passenger fares and other sources.
- BART's strategy for promoting productivity and efficiency emphasizes developing human and technological resources in all of its departments, and providing a work environment which perpetuates the desire to provide the best service possible.
- One important strategy for improving BART productivity and efficiency is the stringent adherence to its preventative maintenance program which assures that equipment is in good working order and available for service.
- BART will expand its work force by 7% in the next five years; 165 new positions are needed to maintain 35% more cars, operate 22% more trains, and provide service at a frequency 53% higher than today.
- BART's Load Factor Monitoring Program is an important part of the strategy to provide adequate capacity and achieve its load factor objectives, while minimizing unecessary car miles and related expenses.
- Additional productivity gains are partly contingent upon innovative scheduling of cars and BART's acceptance of average train load factors above the current 1.00 policy to reduce car miles and related costs.
- BART's joint development, concessions, and property management programs will seek to increase the productivity of stations and adjacent properties in terms of realizing a greater share of their revenue generating potential.
- Efforts will also be directed to stimulating income from leases and concessions by providing an opportunity for BART-compatible businesses to locate in stations.

PERFORMANCE INDICATORS

- Rail farebox ratio (Key)
- Express bus farebox ratio
- System farebox ratio
- System operating ratio (Key)
- Rail cost per passenger mile (Key)
- System utilization
- Car miles per equivalent employee
- Industrial injury rate
- Employee sick leave rate
- MBE/DBE participation

REFERENCE DOCUMENTS

- MTC Regional Transit Productivity Improvement Program (1987)
- BART Privatization Program (1988)
- BART Maintenance Program (1988)
- BART Affirmative Action Program (1986-1991 Update)

Progress for BART means being more productive and efficient; a match of **human and technological resources** that can yield quality service, better now than before. Productivity starts with individuals using a combination of talents, tools, and persistence to meet a challenge. To do a better job is to fulfill a basic human need to feel useful and to satisfy the desire to improve. As an organization, BART's challenge is to promote productivity and efficiency by providing a work environment and management style which perpetuate this desire.

PEOPLE MAKE THE DIFFERENCE

BART is people, a family of individuals related by common employment and engaged in a common purpose. Like a family, there is communication, responsibility, recognition, and a committment to its members based on developing the human resources needed to advance the organization through personal achievement and group effort. A guiding philosophy, one which has served BART well, is that **the way to a more favorable "bottom line" is through the development of a "top-of-the line" workforce.** This is evident in the caliber of people who make up BART's workforce, by its training and educational programs, and by career opportunities which reflect the organization's committment to upward mobility and affirmative action. In short, people make the difference, and **investing in individuals** is a key aspect of BART's strategy for improving productivity and efficiency. Some investments yield immediate results. Others take more time. All are needed to nurture ideas and to produce effective actions and results.

Productivity is often presented in the context of projects and the ability to increase output at a rate greater than the comittment of resources. BART is no exception in this regard and, in fact, has developed its capital improvement program with productivity and efficiency as key justifying criteria. Equally as important is BART's emphasis on people. Sustaining favorable levels of productivity depends upon continued human dedication, the additive to technology that fuels progress.

BART's committment to providing the best service possible to its customers applies, as well, to its employees, who are customers to one another. Because of this, efforts to increase productivity and efficiency will focus on developing the human resources and relations to advance BART in accordance with its mission and goals.

PUTTING KNOWLEDGE TO WORK

To BART, productivity and efficiency mean delivering quality transportation service where production costs are held in line relative to revenues. Accomplishing this requires knowledge about these two factors, **costs and revenues,** and implementing programs to bring desired results. Progress toward realizing increased productivity and efficiency is tracked by ten performance indicators. Five of these indicators consist of important revenue-cost ratios; four are service output ratios; and one additional performance indicator tracks BART's effectiveness toward achieving its affirmative action objective for disadvantaged business enterprise participation. These ten performance indicators are summarized in the reference guide at the beginning of this chapter, and in Figures 2 and 3 which present all of BART's policy elements. Each productivity and efficiency indicator is discussed in the next section along with BART's supporting program objectives. Attention is given to the revenue-cost indicators for productivity and efficiency, since these constitute important budget considerations.

The **system operating ratio**, one of BART's key indicators for productivity and efficiency, measures total operating revenue relative to total operating expense. This is expressed as a percentage, one which represents the portion of operating costs recovered by all sources of revenue. (Revenue sources consist of passenger fares and income derived from concessions, advertising, interest, and other sources. Financial assistance from local taxes and other government funds is not considered as revenue and does not figure in the operating ratio.)

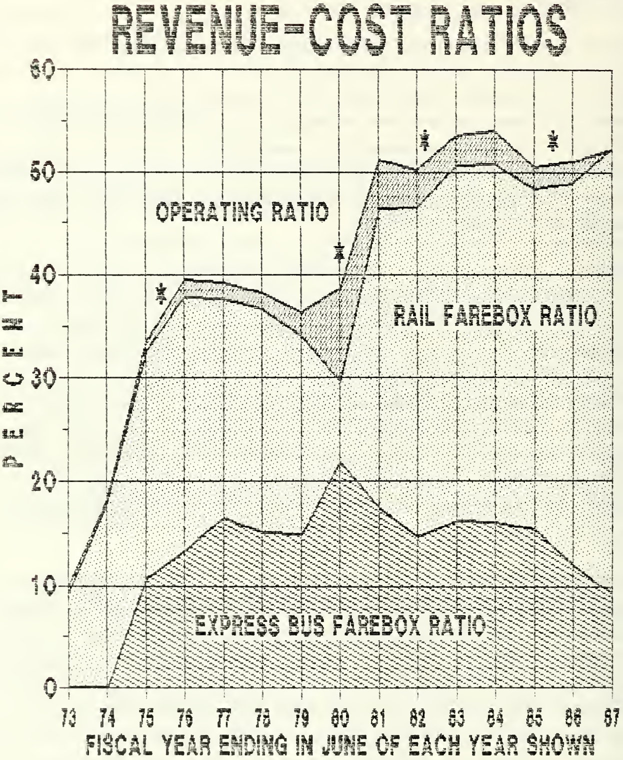
A second and similar revenue-cost indicator for productivity and efficiency is the **rail farebox ratio**, which is also expressed as a percentage and compares rail passenger revenue to rail operating costs. This ratio does not include passenger revenue or expense for transportation which is provided by BART through contract services. This is tracked separately by the **express bus farebox ratio.**

Figure 21 presents fiscal year averages for these three revenue-cost ratios since the startup of service. The profiles for the operating and rail farebox ratios are very similar. Both start out at the same low level when BART service first began and rise with increasing ridership. Growth in income starting in FY 1975/76 from advertising, concessions, and interest pushed the operating ratio a few percentage points above the rail farebox ratio. **Performance for both indicators gradually eroded during the latter 1970s under high inflation and constant fare levels.**

The service disrupting effects of the transbay tube fire and labor dispute are seen as a widening gap between the operating and rail farebox ratios in fiscal years 1979/80 and 1980/81. During this period, erosion of ridership and passenger revenue had more of a negative impact on the rail farebox ratio. Finally, the narrowing gap between these two indicators after FY 1980/81 is the result of **escalating express bus costs and reduced interest income,** both of which had an unfavorable impact on the operating ratio. The sharp increase for both the operating and rail farebox ratios between fiscal years 1979/80 and 1980/81 reflects the June 1980 fare increase, and a sharp gain in ridership and fare revenue in response to the start up of Richmond/Daly City service and additional service on other routes.

Improving BART productivity and efficiency hinge on controlling operating expenses relative to generating increased revenues from passenger fares and other sources. Because labor expense constitutes about two-thirds of BART's total operating budget, efforts to realize productivity gains will continue to focus on stepping up output with less than proportional staffing increases. Additionally, BART will continue to evaluate aspects of its operation for which private enterprise participation may provide cost advantages as well as preclude the addition of new BART positions. (Privatization is discussed under appropriate program areas in sections that follow.) The operating and rail farebox ratios have held fairly constant since FY 1982/83 and are currently just above 50%. This is consistent with **BART's goal to maximize the**

Figure 21



Fare increases are denoted by asterisks (*).

contribution to operating costs from passenger revenues, consistent with reasonable fare levels, to acheive a farebox ratio above 50%. This contrasts with declining productivity for BART express bus service as reflected by decreasing farebox ratios since FY 1979/80.

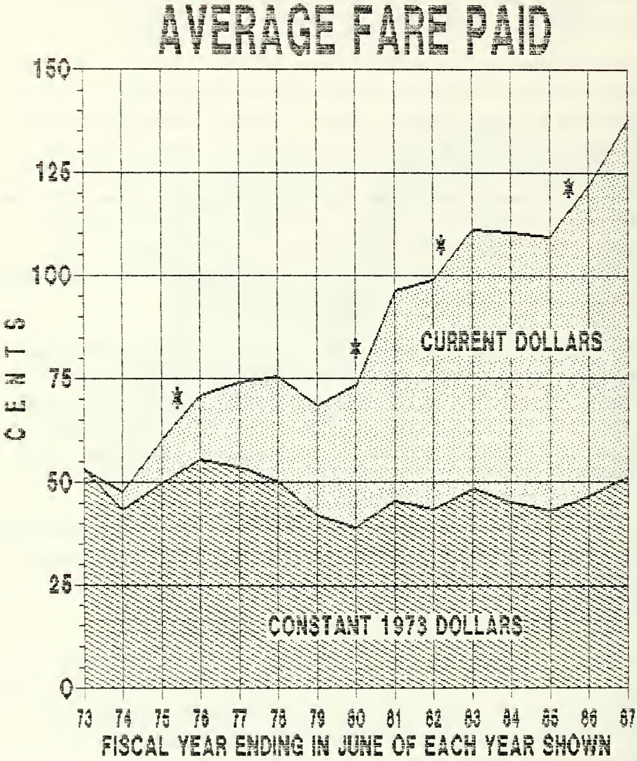
From the revenue side, efforts to increase productivity clearly rest on BART's ability to stimulate ridership at fare levels that are reasonable. A clue to establishing fair and competitive pricing to increase ridership and revenue is to look at how "reasonable" BART's fares have been. Figure 22 shows the average BART fare paid by customers for each fiscal year. **When factored for inflation, the average fare of just over 50¢ per ride is no higher today than during BART's first year of operation.** Of course, in current dollars the increase of more than two and one-half times is readily apparent. This reflects the impact of inflation which has affected nearly all consumer goods and services by a factor of 2.7 between 1973 and 1987.

When the purchasing power of the dollar is considered, **BART fares have been kept in line** as Figure 22 shows. Customer perception, however, argues otherwise. Fare increases require an adjustment on the part of the customer, one which is just as much mental as economic. This suggests that future fare increases should be relatively small and implemented at more frequent intervals.

The decrease in BART's other income, primarily from falling interest earnings, further suggests that **ways need to be found to stimulate additional revenue.** Prospective sources include advertising, concessions, leases, and joint development.

What about on the cost side? How do BART's operating expenses compare relative to system use? How have the unit production costs changed over time and what are the key controlling factors? To help answer these questions, Figure 23 charts each fiscal year's **rail cost per passenger mile.** This measure is the third key indicator for productivity and efficiency, one which tracks service production costs relative to service consumption. As shown, **BART's rail cost per passenger mile has experienced an overall decline when factored for inflation.**

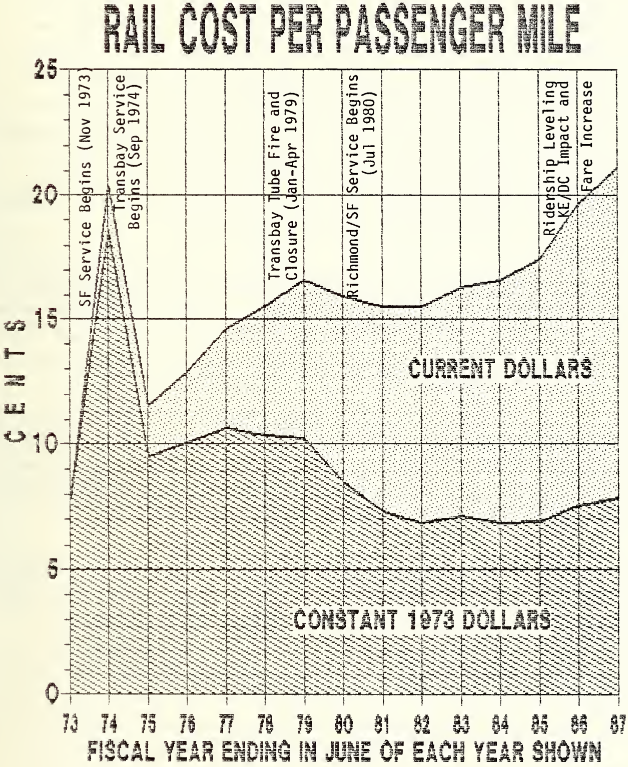
Figure 22



Fare increases are denoted by asterisks (*).

Range of BART fares and dates implemented: Sep 1972, $0.25 - $1.25
Nov 1975, $0.30 - $1.60
Jun 1980, $0.50 - $1.75
Sep 1982, $0.60 - $2.15
Jan 1986, $0.80 - $3.00

Figure 23


RAIL COST PER PASSENGER MILE
CENTS
0
5
10
15
20
25
SF Service Begins (Nov 1973)
Transbay Service Begins (Sep 1974)
Transbay Tube Fire and Closure (Jan-Apr 1979)
Richmond/SF Service Begins (Jul 1980)
Ridership Leveling KE/DC Impact and Fare Increase
CURRENT DOLLARS
CONSTANT 1973 DOLLARS
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
FISCAL YEAR ENDING IN JUNE OF EACH YEAR SHOWN

This favorable trend is indicative of BART's ability to size trains to meet demand. This has a direct impact on labor and non-labor costs and reflects the degree of operational efficiency. This point is clearly illustrated in Figure 23 by the "spike" for FY 1973/74. As shown, BART's rail cost per passenger mile jumped more than three fold in one year. This is because the start of service within San Francisco, prior to being granted the authority to carry passengers through the transbay tube, required shuttling empty trains between BART's three East Bay maintenance yards and the City. The net result of this was a disproportionate increase in operating costs relative to ridership. This situation was corrected in September 1974 when transbay service began and ridership increased sharply. As a result, BART's rail cost per passenger mile returned to an acceptably low level.

The key variable costs are electric power consumption and car maintenance, both of which are a factor of the distance BART cars travel. More car miles mean higher power and maintenance expenses. Accordingly, **BART's load factor monitoring program is a vital part of the strategy for controlling these costs.** The effectiveness of this program is based on BART's ability to capture both train and passenger flow data, summarize it in a meaningful way, and act in a timely manner. The importance of the load factor monitoring program with regard to improving productivity and efficiency is reflected by its repeated inclusion in BART's Productivity Improvement Program submittals to MTC.

Because of the sizeable impact on operating expenses, the need for additional staff undergoes rigorous review as part of BART's annual budget cycle. New positions must be justified as essential for supporting higher service levels. Prior year budgeted positions are also reviewed and appropriate adjustments made. The results of this review in terms of future BART staffing are presented in Figure 24. To meet BART's service requirements, **165 positions will be added over the next five years.** Compared to now, this is a 7% increase in BART's workforce; people needed to help generate 29% more passenger revenue, maintain 35% more cars, operate 22% more trains, and provide peak period service at a frequency 53% higher than today.

Figure 24

PROJECTED REQUIREMENTS FOR ADDITIONAL OPERATING STAFF POSITIONS*

		Incremental Positions as of June 30					
Department	Budget 87/88	88/89	89/90	90/91	91/92	92/93	5-Year Increase
GENERAL MANAGER	5.0	0.0	0.0	0.0	0.0	0.0	0.0
LEGAL	18.0	0.0	2.0	0.0	0.0	0.0	2.0
FINANCE	110.0	0.0	10.0	1.0	1.0	1.0	13.0
DISTRICT SECRETARY	4.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC AFFAIRS	12.0	0.0	0.0	0.0	0.0	0.0	0.0
SAFETY	14.0	0.0	0.0	0.0	0.0	0.0	0.0
EMPLOYEE RELATIONS	48.0	1.0	0.0	0.0	0.0	0.0	1.0
AFFIRMATIVE ACTION	8.0	(1.0)	0.0	0.0	0.0	0.0	(1.0)
PLANNING, BUDGET AND RESEARCH	30.0	(2.0)	0.0	0.0	0.0	0.0	(2.0)
MATL MGMT & PROCUREMENT	74.0	(2.0)	0.0	0.0	0.0	0.0	(2.0)
INFORMATION SYSTEMS	35.0	0.0	0.0	0.0	0.0	0.0	0.0
ADMINISTRATIVE SERVICES	32.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Admin. and Support Services	390.0	(4.0)	12.0	1.0	1.0	1.0	11.0
MAINTENANCE & ENGINEERING			0.0	0.0	0.0	0.0	0.0
MAINTENANCE SUPPORT	117.0	6.0	0.0	0.0	0.0	0.0	6.0
COMMUNIC/COMPONENT REPAIR	157.0	3.0	0.0	2.0	2.0	1.0	8.0
ROLLING STOCK MAINTENANCE	316.0	39.0	9.0	0.0	0.0	0.0	48.0
POWER & WAY MAINTENANCE	465.0	13.0	7.0	15.0	3.0	0.0	38.0
ENGINEERING & CONSTRUCTION	52.0	2.0	0.0	0.0	0.0	0.0	2.0
Total Maintenance and Engineering	1,107.0	63.0	16.0	17.0	5.0	1.0	102.0
FIELD SERVICES	27.0	1.0	0.0	0.0	0.0	0.0	1.0
TRAIN OPERATIONS	319.0	17.0	11.0	1.0	0.0	0.0	29.0
STATION OPERATIONS	210.5	6.0	1.0	3.0	0.0	1.0	11.0
POLICE SERVICES	171.5	(1.0)	1.0	7.0	3.0	1.0	11.0
Total Field Services	728.0	23.0	13.0	11.0	3.0	2.0	52.0
Total Operations Departments	1,835.0	86.0	29.0	28.0	8.0	3.0	154.0
Total District	2,225.0	82.0	41.0	29.0	9.0	4.0	165.0
Cumulative Increase	--	82.0	123.0	152.0	161.0	165.0	

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* Includes part-time Train Operators, Station Agents, and Police Cadets at one-half position each.

Does not include capitalized or other reimbursable labor. Negative entries for for FY 1988/89 generally reflect positions being converted from operating staff to reimbursable positions.

ACTING ON OPPORTUNITIES

BART's strategy for increasing productivity and efficiency over the next five years is presented in the following sections by program area. BART's operating budget projections (which are discussed in detail in Chapter Four) are based on the anticipated results of these actions.

The **rail farebox ratio** is targeted at **49.6%** for FY 1988/89, and is forecast to hold steady at about 50% in the four out years. The **system farebox ratio,** which includes express bus revenue and expense, is forecast to be **45.9%** for FY 1988/89 and is expected to hold to about 48% through FY 1992/93. The system **operating ratio** is targeted at **48.4%** for FY 1988/89, and is forecast to rise slightly and average just over 50% in the four out years. The **railcost per passenger mile** is forecast to start out at **21.8¢** in FY 1988/89, and increase by an average annual rate of 2.7% per year for the next four years reaching 24.2¢ by FY 1992/93.

Specific actions, program objectives, and other performance indicators for productivity and efficiency are as follows.

*** Capacity and Reliability ***

One of the primary benefits of the **Capacity Expansion Program** is added operational flexibility which will allow BART to minimize expenses associated with vehicle maintenance and electric power. The completion of the KE **Track** in January 1986 was the first milestone for accomplishing this under this program. This new mainline track and sidings in downtown Oakland have **reduced car miles** and related expenses as a result of its train storage capability.

The Daly City Turnback and C-cars will allow for even greater operational efficiency. The Turnback, like the KE Track, provides for storage of trains during the midday and at night, eliminating wasteful and unnecessary deadheading. The new C-cars will enhance efficiency further by allowing for quick train sizing. While crucial to adding new service, the combination of the KE Track, Daly City Turnback, and C-cars also permits more service to be operated with the addition of less than proportional car miles. That's why over the next five years car miles are projected to increase by only 13%, compared to a 35% expansion for BART's fleet, and providing maximum train frequencies 53% higher than today.

The policy regarding load factors greatly influences the degree of car mile savings which can be realized. As discussed in Chapter Two, this policy has been revised from one based on achieving a balance of peak train loads (under conditions of not having any additional cars) to one based on achieving a 1.00 average peak train load factor for those consists BART can alter (as determined by the allowable 3-car minimum and 10-car maximum train lengths). **BART's revised load factor policy effectively reduces overall train crowding compared to today, and requires more cars to be placed in service relative to what would have been needed under the load factor balancing objective.**

BART's load factor policy was revised for two reasons. First, the introduction of the C-cars and use of the Daly City Turnback will change how the system is operated. Current efforts to simulate operations under these new conditions show a need to provide slightly more capacity (e.g., longer trains) at first, and to gradually fine tune the system over time. The second reason BART's load factor policy was revised is based on planned marketing efforts which will focus on new service and capacity as key selling points for increasing ridership.

Achieving the revised load factor policy offsets some of the potential car mile savings which the Capacity Expansion Program provides. Accordingly, **the performance trend, as measured by BART's productivity and efficiency indicators, is projected to hold steady over the next five years** relative to today. **System utilization**, or the ratio expressed as a percent of passenger miles to seat miles, is forecast to be **32.7% in FY 1988/89**, and is projected to be just over 33% for the four out years. **Car miles per equivalent employee** are projected to **increase 0.8%** over the next five years, from **16,047** in FY 1988/89 to **16,567** in FY 1992/93. (One equivalent employee is based on 2,000 hours worked per year including overtime and excludes capitalized and other reimbursable labor hours.)

Future productivity gains with respect to capacity will depend largely on BART's ability to make full use of the capacity expansion projects now coming online, as well as accepting higher load factors. Continued adherence to stringent preventative maintenance standards will also assist BART in increasing productivity and efficiency by assuring that equipment is in good working order and available for service.

*** Safety ***

Customer safety and security is paramount to favorable performance and maintaining public confidence in the system. Public perception of BART safety and security affects ridership (see Chapter One). Accidents also are reflected by BART's service delivery indicators (see Chapter Two). As such, efforts to maximize productivity and efficiency will focus on maintaining a safe and secure environment for train operations, stations, and parking facilities. This includes considerations from the perspective of customer safety as discussed in previous chapters, and from the perspective of employee safety as discussed below.

The most common industrial injuries involve falls, sprains, cuts, and hazardous materials. These constitute the greatest percentage of all employee accidents. The loss in productivity, as measured by **employee lost time** is closely monitored. BART will continue its efforts to maintain high safety awareness among its employees through training and periodic review and update of work procedures. Efforts in the current five-year timeframe will focus on **reducing the total annual amount of employee lost time due to industrial injuries** as a percent of time worked to **0.50% or less.**

Another form of employee lost time is **sick leave.** BART will focus efforts to **promote employee wellness and control employee use of sick** leave to a rate **no higher than 3.50%** of time worked.

*** Access ***

The primary impact access improvements will have is to promote increased ridership. This has direct bearing on all of BART's ridership based productivity and efficiency indicators, which include the four revenue-cost ratios, rail cost per passenger mile, and system utilization. For details of BART's access program, refer to Chapter One of this document and the 1988 Capital Improvement Program which is under separate cover.

Privatization of BART express bus service presents an opportunity for improving productivity and efficiency. Future productivity will depend upon contractor performance (including the achievement of BART's **95% express bus ontime** objective) and the potential cost savings from contracting this service to lower cost bus operators.

*** Human Resources ***

A key aspect of BART's strategy to increase productivity and efficiency is the continued investment in its workforce. Emphasis will be given to the ongoing development of skills and management techniques necessary for advancing BART in terms of the achievement of its objectives. To assist in this effort, BART will implement practices and procedures to support its **customer service philosophy** in FY 1988/89. The purpose of this program is to foster greater awareness on the part of employees of BART's need to deliver quality service. Individual performance and responsibilities, whether involving direct customer contact or supporting roles will be redefined in terms of providing better service.

Human resource development also includes BART's committment to **affirmative action.** Efforts will continue to focus on implementation of BART's updated Affirmative Action Program as a means of promoting upward mobility and achieving **workforce representation** objectives. As part of BART's committment to affirmative action, efforts will also focus on productively engaging in contracting for goods and services with local minority owned businesses. BART will work to maintain **21% minority business enterprise participation** for all District contracts determined to have MBE opportunities, including **21% DBE participation** for all federally assisted contracts awarded during the year. Additionally, BART will work to achieve a minimum of **15% equity participation in joint development projects.** These projects are discussed below and in joint development sections in Chapters One and Two.

*** Joint Development ***

A primary purpose of BART's joint development program is to enhance the organization's revenue base by increasing the productivity of the station areas. Methods for accomplishing this include leasing of land and/or air rights at stations, incorporating special station entrances into developments, and coordinating efforts with local jurisdictions for developing land adjacent to BART stations. This ties directly to one of BART's three mission statements to **maximize the return on its investments in property, rights-of-way, and facilities**, and the supporting goal to **develop station area sites for the realization of increased patronage and revenues, and to enhance the communities BART serves.**

Activities for accomplishing this will focus on achieving two program objectives for FY 1988/89. These are to **complete station plans for Hayward, El Cerrito del Norte, and Bay Fair**, and to **execute a minimum of one ground lease**.

*** Concessions and Property Management ***

BART will be increasing efforts to realize more immediate productivity gains with regard to revenue generation of its property. This is reflected by the 73% increase in revenue from concession permits. This increase is based on favorable permit agreements with various firms with whom BART is currently negotiating. BART will continue to generate income through its property management program from the sale of unproductive land and the leasing of excess land.

In the current five year timeframe, BART will also pursue ways to increase other sources of non-passenger revenue. Opportunities exist for transforming stations into more vibrant activity centers containing a mix of retail and service businesses. BART owns and is in control of prime Bay Area real estate. Efforts to recover larger portions of operating expenses will depend, in part, upon how effective BART is in putting these assets to more productive use.

*** Extensions ***

Extensions of BART were discussed in Chapters One and Two with regard to providing rail links to currently unserved areas and tapping new markets. Depending upon ridership and revenue potential versus operating costs, each extension also presents an opportunity for enhancing BART productivity and efficiency. In short, an extension which can generate a farebox ratio greater than the current system presents itself as an opportunity for increasing BART productivity and efficiency. Additionally, extensions present an opportunity to take advantage of BART's economy of scale in terms of the investment already in place for fixed facilities and human resources.

CHAPTER FOUR:

FIVE YEAR FINANCIAL PLAN

- FY 1988/89 Operating Budget
- Anticipated Growth Rates
- Five-Year Operating Budget Plan
- Financial Capacity Analysis
- Capital Program Overview

CHAPTER FOUR REFERENCE GUIDE

FIVE-YEAR FINANCIAL PLAN

HIGHLIGHTS

- BART's operating budget has been developed on the basis of achieving its objectives and supporting service expansion.
- Total operating expense is projected to be $178.5 million in FY 1988/89, increasing at an average annual rate of 4.8% to $215.2 million in FY 1992/93.
- The percentage share of total operating expense for major budget items include: net labor, 70% throughout the five year period; electric power, 9% in FY 1988/89 and increasing to 10% by FY 1992/93; purchased transportation, 8% in FY 1988/89 and decreasing to 6% by FY 1992/93; and other non-labor, 13% throughout the five year period.
- Net rail passenger revenue is projected to be $81.1 million in FY 1988/89, increasing at an average annual rate of 5.7% to $101.2 million in FY 1992/93, including the effect of an assumed 12.5% increase in fares in 1990.
- Total operating revenue (including rail and express bus passenger revenue and other operating revenues) is projected to be $86.4 million in FY 1988/89, increasing 5.8% per year on average to $108.1 million in FY 1992/93.
- Financial assistance is projected to be $87.2 million in FY 1988/89, increasing at an average annual rate of 5.3% to $107.1 million in FY 1992/93.
- Debt service, capital, and other allocations from BART's operating budget are projected to be $18.7 million in FY 1988/89 and increasing 1.4% annually to $19.8 million in FY 1992/93.
- Deficits for BART's operating budget start out at $4.9 million in FY 1988/89, reducing to $1.8 million in FY 1989/90, and averaging an essentially balanced budget in the remaining three years.
- BART's total capital budget for the five year period is projected to be $1,947 million. Basic system improvements constitute 7% of the total, access improvements 12%, capacity expansion 25%, and extensions 56%.
- BART's strategy for balancing its budget and minimizing the need for additional fare increases will consist of the following options: stimulate additional ridership, generate other revenues, reduce operating expenses, defer service expansion, increase share of MTC allocation, reduce transfer payments, consolidate service, and/or reduce capital allocations.

PERFORMANCE INDICATORS

(See Chapter Three, Productivity and Efficiency, and the financial and TDA indicators presented in Figure 25).

REFERENCE DOCUMENTS

- BART Revised Tentative FY 1988/89 Operating Budget
- BART Budget Performance Reports, FY 1987/88
- BART FY 1986/87 Annual Report
- BART 1988 Capital Improvement Program (CIP)

Provision of existing and expanded service depends on a sound financial structure, both for operations and capital improvements. Based on the foregoing performance objectives for the five-year period, it is the purpose of this chapter to identify the financial requirements for implementing proposed improvements and service expansion, to highlight problems limiting implementation, and to recommend feasible solutions in the form of a five-year financial plan.

FY 1988/89 OPERATING BUDGET

The revised tentative FY 1988/89 **operating budget has been developed to meet BART'sgoals and objectives.** The revised tentative budget is summarized in Figure 25 along with actual figures for FY 1986/87, current year budget and actual/estimated, and projections for the upcoming five-year period. Year-to-year comparisons presented below are in terms of the adopted FY 1987/88 budget.

The budget for FY 1988/89 anticipates net **fare revenues** of $81.9 million with a rail farebox ratio of 49.6%, and **other operating revenues** of $4.6 million, resulting in an operating ratio of 48.4%.

Property tax receipts are estimated at $8.6 million, and **sales tax** receipts are forecast at $96.6 million.

Operating expenses are anticipated to increase by $6.7 million (3.9%) from the FY 1987/88 budget to $178.5 million for the year.

Net **labor cost** is expected to increase $8.8 million (7.6%). Labor cost reflects estimated wage and fringe benefit increases. The increase in this item also includes the cost of 60 new operating positions, 50 of which will support new service and 10 for improvements to current service.

Figure 25

REVISED FIVE-YEAR OPERATING BUDGET FORECAST, 88/89-92/93
12.5% FARE INCREASE ASSUMED MARCH 1990

05/19/88

	Actual 1986/87	Budgeted 1987/88	Est/Act 1987/88	Revised 1988/89	Projected 1989/90	Projected 1990/91	Projected 1991/92	Projected 1992/93
REVENUES ($000)								
Net Rail Revenue (12.5% Increase, March 1990	76,915	78,295	78,704	81,120	86,178	94,027	97,648	101,186
Express Bus Revenue	739	860	706	740	777	816	857	900
Net Passenger Revenue	77,654	79,155	79,410	81,860	86,955	94,843	98,505	102,086
Interest Earnings	4,848	4,378	3,534	2,081	1,916	1,916	1,916	1,916
Other Revenue	2,122	2,117	1,992	2,491	2,859	2,987	3,640	4,070
Other Operating Revenue	6,970	6,495	5,526	4,572	4,775	4,903	5,556	5,986
Net Operating Revenues	84,624	85,650	84,936	86,432	91,730	99,746	104,061	108,072
EXPENSES ($000)								
Net Labor	110,929	115,334	116,414	124,115	130,024	136,808	143,763	150,455
Electric Power	17,075	18,100	14,882	16,680	16,457	18,656	21,004	22,045
Other Non-Labor	18,890	22,683	20,924	22,814	23,863	25,543	27,193	28,706
Express Bus	8,068	8,354	8,554	7,454	6,443	6,443	6,443	6,443
BART Shuttles	157	256	238	345	362	380	399	419
Bus Operator Transfer Subsidies	7,083	7,083	7,083	7,083	7,083	7,083	7,083	7,083
Total Operating Expenses	162,202	171,810	168,095	178,491	184,232	194,913	205,885	215,151
OPERATING DEFICIT ($000)	(77,578)	(86,160)	(83,159)	(92,059)	(92,502)	(95,167)	(101,824)	(107,079)
FINANCIAL ASSISTANCE ($000)								
Property Tax Revenues	7,412	7,639	8,088	8,581	9,011	9,461	9,934	10,431
Sales Tax Revenues (BART 75% Share)	87,091	89,091	91,766	96,611	100,108	105,113	110,369	115,888
TDA ('BART Only')	548	348	348	370	383	403	422	444
STA, Other State Funds	479	1,911	77	305	77	77	77	77
Debt Service Allocations	(13,474)	(12,568)	(12,595)	(14,325)	(14,328)	(14,384)	(14,446)	(14,502)
Capital and Other Allocations	(4,505)	(4,708)	(4,708)	(4,370)	(4,570)	(4,771)	(5,036)	(5,276)
Total Financial Assistance	77,551	81,713	82,976	87,172	90,681	95,898	101,320	107,061
NET FINANCIAL RESULT ($000)	(27)	(4,447)	(183)	(4,887)	(1,821)	731	(504)	(18)
FINANCIAL INDICATORS								
Annual Patronage (000)	56,241	58,369	57,797	59,734	60,863	61,546	63,917	66,232
Annual Passenger Miles (000)	695,944	733,600	726,498	750,755	765,045	773,637	803,432	832,539
Annual Vehicle Hours (000)	1,111	1,103	1,081	1,165	1,164	1,204	1,233	1,250
Annual Vehicle Miles (000)	30,267	30,203	29,674	31,918	31,890	32,980	33,778	34,244
Equivalent Employees (Operations)	1,922	1,932	1,898	1,989	2,014	2,052	2,064	2,067
Fare Box Ratio: Rail Only	52.4%	50.2%	51.7%	49.6%	50.6%	51.9%	50.9%	50.3%
Fare Box Ratio: Express Bus Service	9.2%	10.3%	8.3%	9.9%	12.1%	12.7%	13.3%	14.0%
Fare Box Ratio: Total System	47.9%	46.1%	47.2%	45.9%	47.2%	48.7%	47.8%	47.4%
Operating Ratio	52.2%	49.9%	50.5%	48.4%	49.8%	51.2%	50.5%	50.2%
Rail Cost Per Passenger Mile	$0.211	$0.213	$0.210	$0.218	$0.226	$0.237	$0.240	$0.242
TDA INDICATORS								
Rail Cost Per Vehicle Hour	$132.23	$141.54	$140.82	$140.21	$148.23	$152.28	$156.53	$160.94
Rail Cost Per Passenger	$2.61	$2.67	$2.63	$2.74	$2.83	$2.98	$3.02	$3.04
Passengers Per Vehicle Mile	1.86	1.93	1.95	1.87	1.91	1.87	1.89	1.93
Passengers Per Vehicle Hour	50.63	52.92	53.47	51.26	52.29	51.11	51.84	52.98
Vehicle Hours Per Equivalent Employee	578.1	570.8	569.5	585.8	577.9	586.7	597.5	604.9
CAPITAL AND DEBT SERVICE ALLOCATIONS ($000)								
Revenue Bond Debt Service	12,586	12,568	12,595	14,325	14,328	14,384	14,446	14,502
Sales Tax Anticipation Note Debt Service	888	0		0	0	0	0	0
Improvement Allowance	3,100	3,100	3,100	2,500	2,614	2,729	2,886	3,024
Extension Planning				488	511	533	564	591
Other Planning	1,405	670	670	730	763	798	835	873
Joint Development	0	938	938	652	682	712	752	789
Total Capital and Debt Service Allocations	(17,979)	(17,276)	(17,303)	(18,695)	(18,898)	(19,155)	(19,482)	(19,779)

Figure 26

1988 BART FIVE YEAR PLAN OPERATING PARAMETERS AND FORECASTS

	REVISED	FORECAST			
	FY 1988/89	FY 1989/90	FY 1990/91	FY 1991/92	FY 1992/93
SERVICE DEMAND					
Total Passenger Trips (1,000's)	59,734	60,863	61,546	63,917	66,232
Average Weekday Trips (1,000's)	207	211	214	222	231
Passenger Miles (1,000's)	750,755	765,045	773,637	803,432	832,539
SERVICE DELIVERY					
Minimum Scheduled Headway (min:sec)*	3:10	2:30	2:15	2:15	2:15
Peak Period Trains Online*	51	52	53	53	53
Peak Period Cars Online*	365	416	441	452	452
Car Hours (1,000's)	1,165	1,164	1,204	1,233	1,250
Car Miles (1,000's)	31,918	31,890	32,980	33,778	34,244
PRODUCTIVITY & EFFICIENCY					
Net Operating Revenue (1,000's)	$86,432	$91,730	$99,746	$104,061	$108,072
Total Operating Expense (1,000's)	$178,491	$184,232	$194,913	$205,886	$215,151
System Operating Ratio	48.4%	49.8%	51.2%	50.5%	50.2%
Rail Farebox Ratio	49.6%	49.9%	51.3%	50.6%	50.3%
Rail Cost Per Passenger Mile	21.8¢	22.6¢	23.7¢	24.0¢	24.2¢
Equivalent Operating Employees**	1,989	2,014	2,052	2,064	2,067

*Maximum service level programmed during respective fiscal years.

**One equivalent employee is equal to 2,000 hours worked per year, excluding capitalized labor and other reimbursable labor hours.

The cost of the **express bus and shuttle program** is expected to decrease by $0.8 million, reflecting privatization of BART express bus service which is to take place under a new contract beginning December 1988. **Transfer payments** to AC Transit are expected to cost $5.8 million. In accordance with the regional transit financial planning agreement among BART, the two other major transit operators and MTC, transfer payments will also be made to MUNI for $1.3 million.

Traction and station **power cost** is expected to be $1.4 million lower than the cost budgeted for FY 1987/88. Other nonlabor expense is expected to increase by $0.1 million. Expected receipts of financial assistance through MTC of $0.3 million SB-1335 (STA) and $0.4 million TDA funds are budgeted.

As called for in last year's Five Year Plan, certain capital expenditures are also to be funded from operating sources. **Capital allocations** totalling $4.4 million are budgeted for improvement allowance ($2.5 million) and planning and station area development ($1.9 million). The operating budget will also fund **debt service allocations** of $14.3 million for the revenue bond debt service.

After these allocations have been budgeted, **total operating uses exceed sources by $4.9 million.**

FIVE-YEAR OPERATING BUDGET PLAN ELEMENTS

Over the five-year period, **labor cost** is anticipated to constitute **70%** of BART's operating budget, with the remaining **30%** for **nonlabor** items. The operating budget plan in Figure 25 includes two components of labor expense, the current base and that which is required for expanded service. The base includes those positions which are needed to maintain current service. Over the five-year period, some new positions will have to be added for this purpose. However, most of the increase in the base reflects the cost of anticipated improvements in wages and benefits as covered by new contracts which are to be negotiated during this five-year cycle. Maintaining current employee benefits over the five-year period and providing the additional positions needed to continue existing service are also included.

Nonlabor expense includes two major items: electric power and purchased transportation (express bus, shuttle and feeder service), and a variety of other lesser items.

The forecasting of future power cost increases is subject to a considerable degree of uncertainty given the large number of influencing factors. These include decisions made at the state and federal levels concerning atomic power plant certification and international political developments which affect the price and/or availability of oil. Another significant factor is the magnitude of available hydroelectric resources as determined by the Sierra snowpack. The **power cost associated with providing the current level of service is expected to increase by an average of 5.7% annually.** Snowpack and fuel price levels, together with the availability of electric power from alternate sources, will impact future BART power cost estimates. Alternate sources of power are being evaluated and future cost projections may be affected.

As adopted by the BART Board of Directrs in April 1988, **express bus service will be operated by a private firm** beginning in December 1988. This is expected to result in substantial savings relative to the projected expense with AC Transit. During FY 1988/89, this savings is estimated to be $1.1 million.

All **other nonlabor expense items are expected to increase by an average of 4.6% annually** to maintain current service. This rate approximates the projected annual increase in the CPI. Actual increases are greater due to the additional service planned.

BART passenger growth was documented above in Figure 4 (see Chapter One). For financial planning purposes, **a 12.5% fare increase is assumed** concurrent with the planned March 1990 start of service at 2-minute 30-second headways. This increase approximates the projected growth in the CPI. Other operating revenue is expected to be somewhat lower than previously budgeted because of declining interest rates on investment of operating funds and the impact of the new tax laws on tax anticipation notes.

For the upcoming five-year period, BART **sources of financial assistance** are forecast to grow at somewhat lower rates than were assumed in last year's plan, reflecting slower economic growth. **Sales tax** yields are projected to expand by 5.3% in FY 1988/89, 3.6% in FY 1989/90 and 5% each year thereafter, based in part on the projected statewide growth forecast by the Commission on State Finance, as adjusted for historically lower growth in the three BART counties. **Property tax** revenues are expected to increase by 6% in FY 1988/89 and 5% each year thereafter.

Discretionary financial assistance, which is allocated to BART by MTC, is likewise projected at significantly different levels in this year's Five Year Plan, based on the preliminary allocation estimate furnished earlier this year. This estimate calls for only $0.3 million of STA funds and $0.4 million of TDA funds. For purposes of the current financial plan, TDA funds are expected to grow at the rate indicated above for BART sales tax revenues. The FY 1988/89 STA allocation reflects a one-time prior year carryover. Due to continued uncertainty about the continuation of the STA program beyond the one-year extension now being considered by the Legislature, funds projected from this source for subsequent years are expected to remain at the level realized in FY 1987/88.

According to the projections in Figure 25, the five-year financial outlook is reasonably positive, assuming that fares are increased by 12.5% in March 1990. Manageable deficits are projected for the first two years, followed by an essentially balanced budget thereafter. This outcome depends heavily on realization of anticipated ridership growth, and the forecast savings in power and express bus expense (vis-a-vis earlier projections).

The plan assumes that the revenue bond debt service requirements will be funded each year by an allocation from the operating budget. This and other debt service requirements are summarized in Figure 27.

FINANCIAL CAPACITY ANALYSIS

[To Be Provided in Final Version of Five-Year Plan]

CAPITAL PROGRAM OVERVIEW

With virtual complete funding of the Capacity Expansion Program now assured, the focus of BART's Capital Improvement Program over the next five years will shift to funding the construction of **extensions** and major **access** improvements to stations. The total cost of the program is estimated to be **$1.9 billion,** with funding by project areas as shown in Figure 28. Estimated annual cash flows, funded and unfunded, are summarized by project area in Figure 29 and by funding source in Figure 30.

The majority of the Five Year Plan funding (56%) will be applied to the Extensions Program in Alameda and Contra Costa counties. For a more detailed presentation, please refer to BART's 1988 Five Year Capital Improvement Program which is under separate cover.

Figure 27

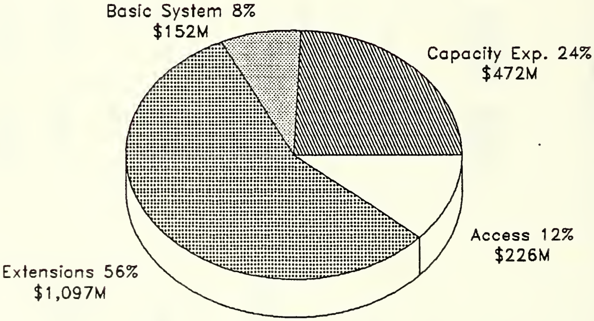
FIVE-YEAR PLAN DEBT SERVICE SUMMARY
($1,000s)

	ACT/EST	BUDGETED	FORECAST			
	FY 87/88	FY 88/89	FY 89/90	FY 90/91	FY 91/92	FY 92/93
Debt Service Expense						
General Obligation Bond Interest Redemption	54,737	55,311	55,443	47,189	47,096	46,972
SSD #1 Bond Interest and Redemption	736	736	735	733	730	735
Revenue Bond Debt Service	12,568	14,460	14,550	14,580	14,644	14,704
Total Debt Service Requirements	$68,041	$70,507	$70,728	$62,502	$62,470	$62,411
Sources of Funds						
General Obligation Bond Interest and Redemption Fund	54,737	55,311	55,443	47,189	47,096	46,972
SSD #1 Bond Interest and Redemption Fund	736	736	735	733	730	735
Allocation from Operating Budget for Revenue Bond Debt Service	12,568	14,460	14,550	14,580	14,644	14,704
Total Sources of Funds	$68,041	$70,507	$70,728	$62,502	$62,470	$62,411

Figure 28

BART Capital Program

Existing & Proposed Funding Uses



Total: $1,947 Million

Total cost of all current and proposed projects in the BART CIP. Total does not include Colma/SFO Extension

Figure 29

FIVE-YEAR FUNDED AND UNFUNDED CASH FLOW SUMMARY BY PROJECT CATEGORY
(Thousands of Dollars)

PROJECT CATEGORY	PRIOR YEARS	FY 1988/89	FY 1989/90	FY 1990/91	FY 1991/92	FY 1992/93	5+ YEARS	TOTAL
Extensions								
Funded	38,565	21,922	7,703	11,499	33,400	79,056	100,828	292,973
Unfunded	0	31,715	41,018	67,500	118,200	234,459	311,204	804,096
Access								
Funded	4,539	12,055	21,053	12,495	474	0	2,602	53,218
Unfunded	0	0	0	500	10,000	27,099	135,329	172,928
Capacity Expansion								
Funded	291,935	150,433	26,012	0	0	0	4,000	472,380
Unfunded	0	0	0	0	0	0	0	0
Basic System								
Funded	44,353	22,477	18,359	9,018	10,948	16,826	8,000	129,981
Unfunded	100	4,719	14,722	1,900	453	0	0	21,894
Total Funded	379,392	206,887	73,127	33,012	44,822	95,882	115,430	948,552
Total Unfunded	100	36,434	55,740	69,900	128,653	261,558	446,533	998,918
GRAND TOTAL	**379,492**	**243,321**	**128,867**	**102,912**	**173,475**	**357,440**	**561,963**	**1,947,470**

Figure 30

FIVE-YEAR FUNDED AND UNFUNDED CASH FLOW BY SOURCE
(Thousands of Dollars)

FUND SOURCE	PRIOR YEARS	FY 1988/89	FY 1989/90	FY 1990/91	FY 1991/92	FY 1992/93	5+ YEARS	TOTAL
Federal Funds								
Funded	190,333	87,266	14,353	5,388	0	0	0	297,340
Unfunded	40	3,804	13,760	1,489	362	13,637	52,507	85,599
State Funds								
Funded	32,815	18,545	1,687	0	0	0	0	53,047
Unfunded	0	10,806	14,436	24,897	35,695	53,787	74,007	213,628
Regional Funds								
Funded	16,237	4,942	461	2,499	28,400	79,056	60,045	191,640
Unfunded	10	883	19,055	37,315	76,161	180,433	243,230	557,087
BART Funds								
Funded	140,007	96,134	56,626	25,125	16,422	16,826	55,385	406,525
Unfunded	50	20,941	8,489	6,199	16,435	13,701	76,789	142,604
TOTAL	**379,492**	**243,321**	**128,867**	**102,912**	**173,475**	**357,440**	**561,963**	**1,947,470**

GLOSSARY

AB-842 PROCESS: State mandated annual financial planning process involving BART, AC Transit, MUNI, and MTC; for the purpose of minimizing budget deficits and allocating the 25% share of the 1/2¢ sales tax in the BART District counties.

A-CAR: A train control equipped vehicle which may be used as the first and last car on each train.

AFC: Automatic fare collection equipment including entry/exit gates, ticket vendors, change machines, etc. Performance is measured in terms of an incident rate per 1,000 passenger trips.

AVERAGE WEEKDAY: Having typical commute day characteristics. Used as the basis to compare actual versus forecast patronage.

BALANCE OF PEAK PERIOD TRAIN CYCLE (also see TRAIN CYCLE): A unit of time used to define the "shoulder" period occurring just before and after the peak one hour. A 2-hour and 27-minute train cycle less the one-hour peak.

BART EXPRESS BUS SERVICE: BART funded bus service linking outlying Eastbay communities to the rail system. This service is provided through a purchase of service agreement with local bus transit agencies.

B-CAR: A vehicle which does not contain train control equipment and is used in conjunction with A- or C-cars to form a train. A BART train may contain up to 8 B-cars.

CAPACITY EXPANSION PROGRAM: BART's strategy for increasing service and capacity which has focused on the implementation of about 12 key capital projects since the early 1980s.

CAPITAL IMPROVEMENT PROGRAM (CIP): A companion document to the Five Year Plan which identifies all of BART's capital projects and the financial plan for their implementation.

CAR COUNT: The number of A-, B-, or C-cars available for service.

CAR HOUR: One vehicle (A-, B-, or C-car) in service for a period of one hour.

CAR MILE: One vehicle (A-, B-, or C-car) which travels a distance of one mile.

C-CAR: A second generation transit vehicle developed as part of BART's Capacity Expansion Program which can be used as a leading/trailing or a mid-train car.

DELAY EVENT: Any occurrence which causes one or more trains to be delayed. Beginning in FY 1988/89, the District's monitoring program is conducted using a five minute delay threshold.

DISCOUNT TICKET: A BART ticket which sells for less than the magnetically stored face value. Discounts range from 6.25% for high value regular adult tickets to 90% for children 5-12, elderly, and handicapped persons.

EMERGENCY PLAN EXERCISE: Exercises coordinated and conducted by BART in cooperation with emergency service providers for the purpose of minimizing response times through familiarization of the system.

EMPLOYEE LOST-TIME INJURY: Any injury which results in the loss of one 8-hour work shift or more. Lost time as a result of an industrial injury may occur in the same quarter as the injury itself, or in later quarters as for many long-term disabilities.

EMPLOYEE LOST-TIME RATE: The ratio, expressed as a percent, of lost time hours to total hours worked.

EMPLOYEE PAID SICK LEAVE RATE: The percentage of paid sick leave hours to paid straight-time hours.

EQUIVALENT EMPLOYEE: A unit of labor based on 2,000 hours worked annually, excluding all capitalized or otherwise reimbursed hours.

ESCALATOR AVAILABILITY: The ratio expressed as a percentage of the number of unit-hours escalators are actually in service to the maximum possible unit-hours during the time the system is open for business. (Elevator availability to be monitored on same basis beginning FY 88/89.)

FAREBOX RATIO: The percentage of net passenger revenue (gross passenger revenue less special fare discounts and other deductions) to total operating expenses. Rail farebox ratio excludes revenue and expense for BART funded bus operations.

FAST PASS: A $25 monthly pass valid for unlimited travel within San Francisco on BART and MUNI.

GOAL: A desired state toward which efforts are directed.

HEADWAY: The time interval between trains, usually expressed in minutes and seconds, which defines a level of service.

JOINT DEVELOPMENT: A cooperative land-use planning and implementation program which seeks to develop station areas into multi-use activity centers where people have an alternative to automobile travel.

KEY PERFORMANCE INDICATOR: High-level performance measures selected on the basis of best overall indication of train service quality, fare equipment dependability, patron response, and financial performance.

LOAD FACTOR: The ratio of on-board passengers to seats. An index of train occupancy, usually measured at a maximum load point.

MAXIMUM LOAD POINT: The point on each train route through which the train passes with the highest number of passengers during a given unit of time in one direction.

MISSION STATEMENT: Declaration of primary tasks.

OFFPEAK PERIOD: All revenue service times other than during weekday morning and afternoon peak train cycles.

OFF-SITE TICKET SALES OUTLET: Participating banking institutions, businesses, and social service agencies which sell BART high value and discount tickets.

OPERATING RATIO: The percentage of total net passenger and other operating revenues to total operating expenses.

PASSENGER MILE: One passenger traveling a distance of one mile.

PATRON ACCIDENT: A filed report of an injury to a patron having occurred on board trains, in station areas, or on other District property. The District's accident rate is expressed as the ratio of reported incidents related to train operations and stations per million passengers carried.

PATRON ON-TIME PERFORMANCE: A measure of service quality reflecting, as a percentage, the ratio of patron trips on time (arrival within 5 minutes of normal time) to total trips for all days. The published timetable is offset one minute earlier than the normal train arrival times.

PEAK HOUR: A 60-minute interval during which time patronage is at its maximum.

PEAK PERIOD: An interval of time consisting of the peak one hour plus the "shoulder" demand periods both before and after the peak hour.

PEAK TRAIN CYCLE: The period of time during which all vehicles available for peak service pass a given point on the system (for load factor monitoring this period is defined as 2 hours and 27 minutes).

PROGRAM AREA: Functional areas of the organization which reflect the concerns expressed in BART's mission statement and goals.

PROGRAM OBJECTIVE: Directive which focuses on the implementation of higher level capital projects and/or activities by specified completion dates.

RAIL COST PER PASSENGER MILE: A financial indicator measured by the ratio of rail operating expense (total operating expense less express bus and shuttle bus costs) for a given period to the number of passenger miles carried on the rail system during the same period.

RELIABILITY IMPROVEMENT PROGRAM (RIP): A program completed in the early 1980s which focused on modifying key components to bring performance to within acceptable standards.

SYSTEM UTILIZATION: A measure of system efficiency as derived by the ratio of passenger miles to seat miles. Equivalent to an average system load factor or average rate of seat occupancy.

THROUGHPUT: The number of cars, trains, or passengers passing a point on the system during a given unit of time in one direction.

BART FARE COMPONENTS AND TICKET PRICES

TRIP LENGTH:	Up to 6 Miles	$0.80
	Between 6 and 14 Miles[1]	$0.92 + 0.069/Mile
	Over 14 Miles	$1.47 + 0.041/Mile
SURCHARGE:	Transbay	$0.45
	Daly City[2]	$0.52
SPEED PREMIUM:	Extra Charge for Faster (or fare reduction for slower) Than Average Trips; Based on Scheduled Travel Time	+/- $0.025/Minute
RESULTING FARES:[3]	Range	$0.80 to $3.00
	Average[4]	$1.69
SPECIAL FARES:[5] **& DISCOUNTED TICKETS:**	Children Under 5 (No Charge)	$0.00
	Children 5 through 12 (90% Discount)	$1.60 ($16.00 Value)
	Persons 65 and Over (90% Discount)	$1.60 ($16.00 Value)
	Qualifying Handicapped (90% Discount)	$1.60 ($16.00 Value)
	Regular Adult (6.25% Discount)	$30.00 ($32.00 Value)
	Excursion (Entry/Exit, Same Station)	$2.60
SEMIMONTHLY PASS:[6]	BART Ticket Combined with AC Transit Semimonthly Pass (unlimited AC use)	8 denominations from $20.00 to $53.00
MONTHLY PASS:[7]	Unlimited Monthly BART/MUNI Travel Within San Francisco	$25.00
EXPRESS BUS: (1 Zone/2 Zone)	Children Under 5 (No Charge)	$0.00
	Children 5 through 12	$0.15/$0.30
	Regular Adult	$0.75/$1.15
	Persons 65 and Over	$0.15/$0.30
	Qualifying Handicapped	$0.15/$0.30
TRANSFERS:[9]	BART Express Bus (Leaving Rail Station)	$0.75 Value
	SF MUNI (Per MUNI Round Trip)	$0.75 Value
	AC Transit (Per AC Round Trip) -- Peak[8]	$0.50 Value
	Off-Peak	$0.90 Value
	CCC Transit Authority (Leaving Rail Station)	$0.35 Value

NOTES:

1. Trips over 6 miles within Eastbay Suburban Zone (Concord-Orinda, Fremont-Bayfair, Richmond-Ashby) priced at fare indicated for trips under 6 miles.
2. Does not apply to Transbay trips.
3. Resulting fares are rounded to nearest 5¢ and encoded in Automatic Fare Collection equipment.
4. Weighted by all BART-ticketed trips (excludes BART/MUNI pass trips) which average 13.9 miles.
5. Discounted multiple-ride tickets are sold at off-site BART ticket outlets and are not available in stations.
6. Includes last ride bonus feature on BART which allows any trip if remaining balance equals 5¢. Demonstration program effective February 1987.
7. The BART/MUNI Fast Pass is available at all San Francisco MUNI pass outlets.
8. Weekdays 6 - 9 a.m. and 4 - 7 p.m.
9. In addition to those shown, transfers are also available for transit services which connect with BART but operate primarily outside the three-county BART District.

BART FARES AND TRAVEL TIMES (in minutes)

Fares

Time

	Daly City	Balboa Park	Glen Park	24th St. Mission	16th St. Mission	Civic Center	Powell	Montgomery	Embarcadero	Oakland West	Concord	Pleasant Hill	Walnut Creek	Lafayette	Orinda	Rockridge	Richmond	El Cerrito Del Norte	El Cerrito Plaza	North Berkeley	Berkeley	Ashby	MacArthur	19th St. Oakland	Oak. City Ctr. 12th St.	Lake Merritt	Fruitvale	Coliseum	San Leandro	Bay Fair	Hayward	South Hayward	Union City	Fremont
Daly City		1.30	1.30	1.30	1.30	1.45	1.45	1.45	1.45	1.85	2.85	2.70	2.60	2.45	2.25	2.00	2.35	2.25	2.15	2.10	2.05	2.00	1.95	1.90	1.90	1.90	2.05	2.15	2.25	2.35	2.50	2.65	2.85	3.00
Balboa Park	5		0.80	0.80	0.80	0.80	0.80	0.80	0.80	1.75	2.80	2.60	2.55	2.40	2.20	1.95	2.30	2.20	2.10	2.00	2.00	1.95	1.90	1.85	1.85	1.85	2.00	2.05	2.20	2.30	2.45	2.60	2.80	2.95
Glen Park	7	3		0.80	0.80	0.80	0.80	0.80	0.80	1.70	2.80	2.60	2.50	2.35	2.15	1.90	2.25	2.15	2.10	2.00	1.95	1.90	1.85	1.80	1.80	1.80	1.95	2.05	2.15	2.30	2.40	2.55	2.75	2.95
24th St. Mission	10	6	4		0.80	0.80	0.80	0.80	0.80	1.55	2.70	2.50	2.45	2.30	2.10	1.85	2.20	2.10	2.00	1.90	1.90	1.85	1.75	1.65	1.65	1.65	1.85	1.95	2.10	2.20	2.35	2.50	2.70	2.85
16th St. Mission	13	8	6	3		0.80	0.80	0.80	0.80	1.55	2.70	2.50	2.45	2.25	2.10	1.80	2.15	2.05	2.00	1.90	1.85	1.80	1.70	1.60	1.60	1.60	1.80	1.95	2.10	2.20	2.30	2.45	2.70	2.85
Civic Center	15	11	9	5	3		0.80	0.80	0.80	1.40	2.65	2.45	2.40	2.25	2.05	1.75	2.10	2.00	1.95	1.85	1.80	1.75	1.60	1.55	1.55	1.55	1.75	1.90	2.05	2.15	2.30	2.40	2.65	2.80
Powell	17	13	10	7	5	2		0.80	0.80	1.40	2.65	2.45	2.40	2.25	2.05	1.75	2.10	2.00	1.95	1.85	1.80	1.75	1.60	1.55	1.55	1.55	1.75	1.90	2.05	2.15	2.30	2.40	2.65	2.80
Montgomery	19	15	12	9	7	4	2		0.80	1.40	2.65	2.45	2.40	2.25	2.05	1.75	2.10	2.00	1.95	1.85	1.80	1.75	1.60	1.55	1.55	1.55	1.75	1.90	2.05	2.15	2.30	2.40	2.65	2.80
Embarcadero	21	16	14	11	8	6	4	2		1.40	2.65	2.45	2.40	2.25	2.05	1.75	2.10	2.00	1.95	1.85	1.80	1.75	1.60	1.55	1.55	1.55	1.75	1.90	2.05	2.15	2.30	2.40	2.65	2.80
Oakland West	28	24	21	18	16	13	11	10	8		1.90	1.70	1.65	1.45	1.15	0.80	1.35	1.20	1.10	0.95	0.85	0.80	0.80	0.80	0.80	0.80	0.80	0.95	1.15	1.35	1.50	1.65	1.90	2.05
Concord	68	63	61	57	55	53	51	49	47	40		0.80	0.80	0.80	0.80	1.75	2.10	2.00	1.95	1.85	1.85	1.80	1.80	1.85	1.85	1.85	1.90	2.00	2.15	2.25	2.35	2.50	2.75	2.90
Pleasant Hill	62	57	54	51	49	46	45	43	41	34	7		0.80	0.80	0.80	1.55	1.95	1.85	1.75	1.65	1.65	1.60	1.60	1.65	1.65	1.65	1.70	1.80	1.95	2.05	2.20	2.30	2.55	2.70
Walnut Creek	58	54	51	48	46	43	41	40	38	30	10	4		0.80	0.80	1.40	1.85	1.75	1.70	1.60	1.55	1.55	1.55	1.55	1.55	1.55	1.65	1.75	1.85	2.00	2.10	2.25	2.45	2.65
Lafayette	53	49	46	43	41	38	36	35	33	25	15	9	6		0.80	1.15	1.70	1.60	1.50	1.45	1.40	1.30	1.25	1.35	1.35	1.35	1.50	1.55	1.70	1.80	1.95	2.10	2.30	2.45
Orinda	48	43	41	37	35	33	31	29	27	20	21	14	11	6		0.80	1.50	1.40	1.30	1.15	1.10	1.00	0.80	1.05	1.05	1.05	1.20	1.40	1.55	1.65	1.75	1.90	2.15	2.30
Rockridge	41	37	34	31	29	26	25	23	21	14	27	21	17	12	7		1.20	1.05	0.90	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.85	1.00	1.20	1.40	1.55	1.65	1.90	2.05
Richmond	59	55	52	48	46	43	41	40	38	30	51	45	42	37	31	25		0.80	0.80	0.80	0.80	0.80	1.20	1.30	1.30	1.30	1.45	1.55	1.65	1.80	1.90	2.05	2.30	2.45
El Cerrito Del Norte	55	50	47	44	42	39	37	35	34	26	47	41	38	33	27	21	5		0.80	0.80	0.80	0.80	1.00	1.10	1.10	1.10	1.35	1.45	1.60	1.70	1.80	1.95	2.20	2.35
El Cerrito Plaza	51	47	44	41	38	36	34	32	30	23	44	38	35	30	24	18	8	4		0.80	0.80	0.80	0.90	1.00	1.00	1.00	1.20	1.35	1.50	1.60	1.75	1.90	2.10	2.25
North Berkeley	48	43	40	37	35	32	30	28	27	19	40	34	31	26	20	14	12	7	4		0.80	0.80	0.80	0.80	0.80	0.80	1.05	1.20	1.40	1.50	1.65	1.80	2.00	2.15
Berkeley	45	40	38	34	32	29	27	26	24	16	37	31	28	23	17	11	15	10	7	3		0.80	0.80	0.80	0.80	0.80	1.00	1.15	1.35	1.50	1.65	1.75	2.00	2.15
Ashby	42	38	35	31	29	26	25	23	21	13	34	28	25	20	14	8	17	13	10	6	3		0.80	0.80	0.80	0.80	0.90	1.05	1.30	1.45	1.60	1.75	1.95	2.10
MacArthur	38	34	31	28	26	23	21	19	18	10	30	24	21	16	10	4	21	17	14	10	7	4		0.80	0.80	0.80	0.80	0.95	1.20	1.35	1.55	1.65	1.90	2.05
19th St. Oakland	34	30	27	24	22	19	17	16	14	7	34	28	25	20	14	8	25	20	17	13	11	8	4		0.80	0.80	0.80	0.80	1.10	1.25	1.50	1.60	1.85	2.00
Oak. City Ctr. 12th St.	32	28	26	22	20	18	16	14	12	5	36	29	26	21	16	9	26	22	19	15	12	10	6	2		0.80	0.80	0.80	1.10	1.25	1.50	1.60	1.85	2.00
Lake Merritt	33	29	26	23	21	18	16	15	13	5	39	33	30	25	19	12	30	25	22	18	16	13	9	6	4		0.80	0.80	1.10	1.25	1.50	1.60	1.85	2.00
Fruitvale	38	34	31	28	26	23	21	19	18	10	43	37	34	29	23	17	34	30	26	23	20	17	13	10	8	5		0.80	0.80	1.05	1.25	1.50	1.70	1.90
Coliseum	42	37	35	31	29	27	25	23	21	14	47	41	38	33	27	20	37	33	30	26	23	20	17	13	11	8	4		0.80	0.80	1.10	1.35	1.65	1.80
San Leandro	46	41	39	35	33	31	29	27	25	18	51	45	42	37	31	24	42	37	34	30	28	25	21	17	16	12	8	5		0.80	0.80	1.10	1.45	1.65
Bay Fair	50	45	43	40	37	35	33	31	30	22	55	49	46	41	35	29	46	41	38	34	32	29	25	21	20	16	12	9	5		0.80	0.80	0.80	0.80
Hayward	55	50	47	44	42	40	38	36	34	27	59	53	50	45	39	33	50	48	42	39	36	33	29	26	24	21	16	13	9	5		0.80	0.80	0.80
South Hayward	59	54	52	48	46	44	42	40	38	31	63	57	54	49	44	38	54	50	47	43	40	37	33	30	29	25	21	17	13	9	5		0.80	0.80
Union City	64	59	57	54	52	49	47	46	44	36	69	63	60	55	49	43	60	55	52	48	45	43	39	35	34	30	26	23	18	14	10	6		0.80
Fremont	69	65	62	59	56	54	52	50	49	41	74	68	65	60	54	48	64	60	57	53	50	47	44	40	38	35	31	27	23	19	15	11	5	

(Continued from inside front cover)

BART FACTS
CALENDAR YEAR 1987 DATA

FARES

Regular Adult: Rail fares are largely based on a distance formula ranging from 80¢ to $3.00. The average weekday rail fare is currently $1.70. Regular express bus fares are 75¢ and $1.15 for one and two zone rides, respectively; rail patrons transferring to an express bus may obtain a free transfer worth 75¢.

Discounts: A maximum 6.25% rail fare discount is provided through the sale of $32 tickets for $30. Rail fares for handicapped persons, students 5-12 years of age, and persons 65 years of age and older are 10% of the regular adult fares. Children under 5 can ride free. Other discounts are provided through specially priced passes and/or ticket books for travel on BART express buses, San Francisco MUNI, and AC Transit.

Transfers: Free transfers can be made between all BART trains. Special agreements between BART and most other Bay Area operators permit up to a 50% discount for connecting transit service (on a round-trip basis).

PATRONAGE

Average Weekday: BART patronage averaged 195,758 trips per weekday during 1987. Of these trips, 96,933 (49.5%) occurred within the 4-hour peak travel period (2 morning hours plus 2 afternoon hours). Transbay trips constitute 49.0% of weekday travel with 23.7% Eastbay and 27.3% Westbay.

Weekends: Saturday ridership averaged 80,926 trips with 46.0% Transbay, 28.8% Eastbay, and 25.2% Westbay. Ridership for Sunday averaged 48,817 with market shares of 46.3% Transbay, 30.4% Eastbay, and 23.3% Westbay.

Total Ridership: Rail ridership totaled 56,707,239 trips during 1987, 4.4% below a forecast of 59,321,800.

CAPACITY

On-Line Requirements: BART currently operates a maximum of 45 on-line trains which require 90 A-cars and 248 B-cars. In addition to these, 8 trains are held as ready spares requiring 16 A-cars and 24 B-cars.

Maximum Service Delivery: As of December 1987, scheduled peak hour capacity for the three Transbay routes serving downtown San Francisco and Oakland stations is 17 trains consisting of 160 cars (or 11,520 seats). For the Eastbay route, which also serves downtown Oakland stations, maximum peak hour capacity is 5 trains consisting of 23 cars (or 1,656 seats).

KEY PERFORMANCE INDICATORS

Train On-Time Performance: Daily on-time performance has consistently been above 90% since October 1980 and averaged 96.1% during 1987.

Scheduled Train Dispatches Completed: Performance has consistently been above 98% since January 1981 and averaged 98.9% during 1987.

Load Factors: Peak hour load factors during 1987 averaged 1.22 for Transbay service and 1.04 for the Eastbay route. Load factors for the shoulder period (approximately 45 minutes before and after the peak hour) averaged 1.10 Transbay and 0.93 for the Eastbay route. Maximum average load factors for offpeak service is 0.73 systemwide.

Peak Period Transbay Throughput: The percentage of scheduled Transbay capacity actually provided during 1987 is 97.2% for trains and 96.9% for cars.

OTHER PERFORMANCE DATA FOR 1987

PERFORMANCE DATA (1,000's)	
Total passengers	56,707.2
Passenger-miles	702,743.6
Car-miles	30,826.5
Car-hours	1,129.6
Rail operating cost	$148,345.7
Express bus cost	$8,286.0
Transfer/Shuttle bus cost	$7,249.4
Total operating cost	$163,881.1
Net passenger revenue	$77,799.7
Other revenue	$5,535.5
Total revenue	$83,335.2
Operating deficit	$80,545.9

PERFORMANCE INDICATORS	
Farebox ratio	47.47%
Operating ratio	50.85%
Passenger-miles/seat-mile	31.66%
Rail operating cost/passenger-mile	21.11¢
Rail operating cost/passenger	$2.62
Total operating cost/passenger	$2.89
Total operating revenue/passenger	$1.47
Total operating deficit/passenger	$1.42
Rail operating cost/car-hour	$131.33
Rail operating cost/car-mile	$4.81
Passenger-miles/car-hour	622.12
Passenger trips/car-mile	1.84

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BART

BAY AREA RAPID TRANSIT DISTRICT

A PLAN FOR PROGRESS

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1988 BART FIVE YEAR PLAN

SEPTEMBER 1988

BART FACTS
FISCAL YEAR 1987/1988 DATA
(JULY 1987 - JUNE 1988)

FIXED FACILITIES

Mainline Track: Revenue service is provided over 71.5 miles of double mainline 66 inch guage track, of which approximately 20 miles are in subway, 24 elevated, and 27 at grade.

Stations: There are 34 stations including 14 in subway, 13 elevated, and 7 at grade. Average station spacing is between 1/2 to 1 mile within and adjacent to San Francisco, Oakland, and Berkeley downtown areas, and 2 to 4 miles apart in suburban areas. Automatic fare collection equipment is located in each station to vend and process patron tickets. As of June 1988, BART provides 26,099 free paved parking spaces at 23 stations and 190 paved spaces at one additional station at a daily charge of 25¢ per space.

Maintenance Facilities: Equipment maintenance is performed at three Eastbay yards located in Hayward, Concord, and Richmond. A special track geometric vehicle is used to analyze the running rails and electrical third rail. Maintenance of right-of-way is routinely performed during off-revenue hours.

Administrative/Central Control Center: Trains are automatically controlled by wayside equipment and supervised by the central computer at BART headquarters located above the Lake Merritt Station in Oakland. Operators on board the leading car of each train have full voice communication with central control personnel and passengers on board, and can override automatic controls should the need arise.

ROLLING STOCK

Fleet Inventory: BART owns three types of revenue vehicles. Control equipped A-cars contain 72 seats, are 75 feet long by 10.5 feet wide, and can only be used as a lead or trail vehicle on each train. Non-control equipped B-cars also contain 72 seats, are 70 feet by 10.5 feet, and can only be used as a mid-train vehicle. Control equipped C-cars contain 64 seats, are 70 feet by 10.5 feet, and can be used as a lead, mid-train, or trail vehicle. As of June 1988, BART owns 137 A-cars, 303 B-cars, and 26 C-cars. All of these vehicles are in the operating fleet except for one A-car which is retained as an engineering test vehicle.

Trains: Train lengths range from 3 to 10 cars. Corresponding seating capacity is between 192 and 720 passengers. Scheduled top speed is 70 mph with a systemwide average of 33 mph, including station stops. Trains stop at each station along a designated route.

SERVICE HOURS

Rail: Rail service is provided between the hours of 5 am and 1:30 am Monday through Friday, 6 am to 1:30 am on Saturdays, and 9 am to 1:30 am on Sundays and major holidays. Closings for individual stations are timed with the schedule for the last train beginning at approximately midnight. Service frequencies (in minutes) for individual routes and line segments are as follows:

	TRANSBAY ROUTES			EASTBAY	CBD LINE SEGMENT	
	Concord-Daly City	Fremont-Daly City	Richmond-Daly City	Richmond-Fremont	San Francisco	Downtown Oakland
WEEKDAY						
Peak Hour	7.5	11	15	15	3.8**	3.8
Midday	15	15	15	15	5	5
Night	20	*	*	20	20	10
SATURDAY						
Daytime	20	20	20	20	6.7	6.7
Night	20	*	*	20	20	10
SUNDAY/HOLIDAY						
All Day	20	*	*	20	20	10

*Requires transfer between Concord/Daly City and Richmond/Fremont routes.
**3.0 minute headway service is operated during peak 15 minutes.

Express Bus: The District also provides express bus service within major travel corridors not served by rail in both Alameda and Contra Costa counties in the Eastbay. Bus service frequencies (in minutes) are as follows:

	Eastern Contra Costa	Western Contra Costa	Central Contra Costa-Alameda	Eastern Alameda
WEEKDAY				
Peak Hour	15	30	30	30
Midday	30	30	30	30
Night	60	60	60	60
SATURDAY				
Daytime	60	30	45	30
Night	60	60	60	60
SUNDAY/HOLIDAY				
All day	60	*	60	60

*No service during this time period.

(Continued on inside back cover)

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

1988 FIVE YEAR PLAN

A PLAN
FOR PROGRESS

The preparation of this report has been financed in part through a grant from the United States Department of Transportation, Urban Mass Transportation Administration under the Urban Mass Transportation Act of 1964, as amended, as passed through the Metropolitan Transportation Commission.

The contents of this report reflect the views of BART, which is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the original views or policy of the U.S. Department of Transportation. This report does not constitute a standard, specification, or regulation.

September 1988

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

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LIST OF ACRONYMS

AC TRANSIT: Alameda-Contra Costa Transit

AFC: Automatic Fare Collection

BART: Bay Area Rapid Transit

CCCTA: Central Contra Costa Transit Authority

CIP: Capital Improvement Program

CPI: Consumer Price Index

CPUC: California Public Utilities Commission

MTC: Metropolitan Transportation Commission

RTA: Regional Transit Authority

SAMTRANS: San Mateo Transit

SF MUNI or MUNI: San Francisco Municipal Railway

STA: State Transit Assistance

TDA: Transportation Development Act

UMTA: Urban Mass Transit Administration

INTRODUCTION:

ELEMENTS OF ACTION

- A Plan For Progress
- Response To Challenge
- The Organization And Its Policy
- The Plan. . .An Overview
- A Special Note

INTRODUCTION REFERENCE GUIDE

ELEMENTS OF ACTION

HIGHLIGHTS

- BART's blueprint for progress is its annually updated Five Year Plan which is used to guide the organization in accordance with its policy.
- BART policy consists of linked elements: mission statement, goals, program objectives, and performance indicators.
- Each policy element is reviewed and updated annually as part of the planning and budget process, providing a guide for the organization in a manner which promotes efficient and effective service.
- The mission statement and goals are the broadest base policy elements.
- Program objectives support the mission statement and goals, and consist of projects or activities targeted for completion by specific dates.
- Performance indicators are measures used to gauge the state of the organization on an ongoing basis and reflect how well BART carries out its mission by working toward fulfilling its goals.
- The highest level performance indicators, those which best reflect overall performance, are designated as key indicators.
- BART's performance indicators are divided into three groups: service demand, service delivery, and productivity and efficiency.
- The chapters in this Five Year Plan follow BART's performance indicator classification: the first, BART's customers; the second, aspects of service; and the third, the organization's productivity.
- The fourth chapter presents BART's five year financial plan for operations and capital improvements.

REFERENCE DOCUMENTS

- San Francisco Bay Area Rapid Transit District Act, Second Edition (January 1, 1977).
- BART Quarterly Performance Report on System Objectives.
- BART Monthly Budget Performance Report.
- BART Quarterly Project Status Report.

A PLAN FOR PROGRESS

Progress is not a product of spontaneity. Progress requires work. Work that is backed by well thought out ideas put together in a way which can bring results. The blueprint for progress is a plan: a tool used for putting ideas into action. BART's blueprint for progress is its Five Year Plan, a document which is updated each year in response to changing conditions and new ideas.

BART, along with other public transit operators in the United States, submits its Five Year Plan to the Federal government's Urban Mass Transportation Administration (UMTA) via appropriate local government agencies. For BART, this agency is the Metropolitan Transportation Commission (MTC), the Bay Area's transportation planning organization through which public transit funding is allocated. At this level, the Five Year Plan serves the vital role of supporting BART's grant applications. It presents BART's case for funding of operations and capital projects in terms of ridership, service, efficiency, and productivity.

The purpose of BART's Five Year Plan is therefore to:

- Present a strategy for progress.
- Support BART's grant applications.
- Provide a sense of mission shared by all BART employees.

RESPONSE TO CHALLENGE

The first formal challenge for BART presented itself in 1957 when the State Legislature created the District in response to Bay Area growth and projected transportation needs. Efforts during the first five years focused on establishing the organization for the purpose of fulfilling the BART District charter which calls for the construction, operation, and maintenance of a rapid transit system in the Bay Area. The 1962 voter approval of a $792 million general obligation bond issue in San Francisco, Alameda, and Contra Costa counties provided the initial funding base and authorization to begin construction of the 71.5 mile system: the first new rail transit system to be built in the United States in over 60 years and the first rail system to make large-scale use of computer technology.

The newness of the technology resulted in a variety of unanticipated problems following the start of revenue service in September 1972. Accordingly, the challenge of the 1970s centered on improving BART's reliability. That challenge was met during the course of the decade, along with increased ridership. BART's focus of attention shifted in the early 1980s toward meeting the challenge of providing more frequent service and greater capacity. BART's Capacity Expansion Program was born out of this need and has already yielded results beginning in late 1986 when two new trains were added to BART's peak period schedule. This is the first of five new service increments under this program, the remaining four of which are to be phased in over the next two years. This transition presents a new challenge to BART, one which will require action this fiscal year.

BART's Five Year Plan speaks to this concern as well as to other important programs which help BART deliver safe, efficient, and economical transportation.

THE ORGANIZATION AND ITS POLICY

The organization of BART (Figure 1) reflects a management structure which has evolved to effectively carry out its programs and policies. The nine-member elected Board of Directors appoints a General Manager, and three other officers who report jointly to the Board and the General Manager (General Counsel, Controller/Treasurer and District Secretary). Ten other department managers report directly to the General Manager.

Decisions regarding programs, projects, and budget matters are based on a thorough evaluation by BART staff which may involve outside consultant participation. Reporting of findings and recommendations is accomplished through appropriate Board Committees (ie: Administration; Engineering and Operations; and Public Affairs, Access, and Legislation). Committee recommendations are then brought forward for the consideration of the full Board.

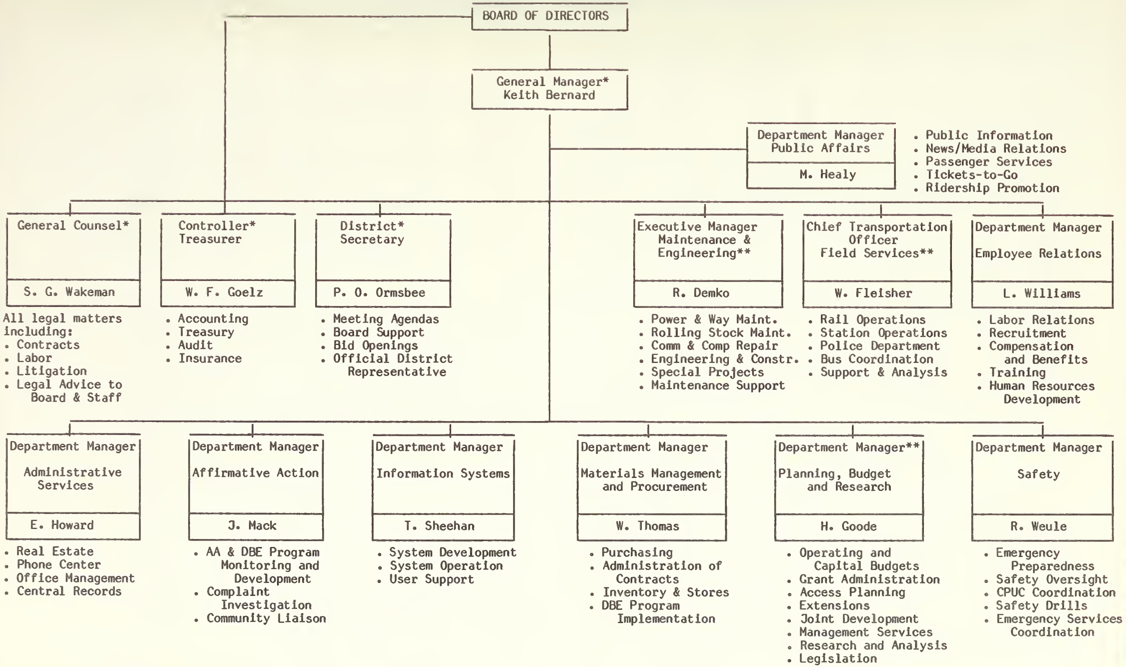
As the legislative body of the District, the Board of Directors establishes BART policy. At its broadest level, this policy consists of BART's mission statement, goals, program objectives, and performance indicators. Each of these elements is reviewed and updated as part of BART's annual planning and budget cycle. BART's Quarterly Performance Report and Monthly Budget Performance Report are key documents used to evaluate the state of the organization. These documents, along with the Quarterly Project Status Report which tracks the implementation of all capital projects, form the bases for updating BART's policy elements. This process guides management in budgeting for and organizing BART's 2,300-plus labor force in a manner which promotes efficient and effective service.

BART's policy framework is summarized in Figure 2 which shows the individual elements and how they are related. Linkages are represented by a nesting of supporting goals under BART's three mission statements. Each of the mission statements and their respective goals are, in turn, linked to one or more programs which are functional areas of the organization. Each program contains objectives consisting of major projects or activities which are targeted for completion by specific dates. The projects and activities called out as program objectives have been selected on the basis of their high impact in support of BART's mission statements and goals. As an example, the program objective to begin 3-minute 10-second headway service by April 1989, listed under Capacity and Reliability, is an important product of the Capacity Expansion Program which is in direct support of BART's mission to "maximize the effectiveness and efficiency of BART operations and bring the system to its full potential." The Capacity Expansion Program objective also relates directly to the first two goals listed under this mission statement which speak to capacity and reliability. The linkages for other program objectives can be traced in the same way.

The remaining policy element, presented in Figure 3, consists of performance indicators which are measures used to gauge the state of the organization on an ongoing basis. The indicators reflect how well BART carries out its mission by working toward fulfilling its goals. The highest level indicators, those which best reflect overall performance, have been designated as key indicators. All of BART's performance indicators measure important aspects of

Figure 1

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT



* Board Appointee
**Project Review Board Member

Figure 2
BART POLICY FRAMEWORK: MISSION, GOALS, AND FY 1988/89 PROGRAM OBJECTIVES

MISSION STATEMENT AND GOALS	FY 1988/89 PROGRAM OBJECTIVES
M1: **MAXIMIZE THE EFFECTIVENESS AND EFFICIENCY OF BART OPERATIONS AND BRING THE SYSTEM TO ITS FULL POTENTIAL.** G1: Operate scheduled 4-route weekday service with route headways of 15 minutes or less during peak and midday periods; expand service within technical and financial limits, including improved peak-hour frequency of service and capacity where needed. G2: Improve the reliability and performance of the present BART system. G3: Fund and implement the necessary capital improvements and replacements to the system. G4: Operate within available funds without incurring an unfunded deficit. G5: Continue to improve BART system and patron safety and emergency preparedness. G6: Improve system access by means of a comprehensive program of parking expansion, feeder services, transit coordination, and special projects addressing elderly and handicapped mobility. C7: Develop and maintain a BART workforce that is motivated to provide the best service possible to BART passengers. G8: Make every effort to achieve District objectives for female and minority employment, and disadvantaged and minority business enterprise participation.	**CAPACITY & RELIABILITY** 1. Continue to implement the Capacity Expansion Program such that the completion of the Daly City Turnback and other required projects will allow for the April 1989 startup of 48-train service at a minimum scheduled headway of 3 minutes 10 seconds. **SAFETY** 2. Conduct a minimum of one emergency plan exercise per month involving response agencies. 3. Develop a comprehensive mitigation plan addressing BART industrial injuries. **ACCESS** 4. Provide 499 additional BART-owned paved parking spaces at existing rail stations by June 1989. 5. Make available a combined BART express bus/rail ticket by June 1989. 6. Complete all elevator conversions by June 1989. **HUMAN RESOURCES** 7. Implement a Districtwide customer service philosophy and assure that departmental objectives and management practices support it. 8. Work to achieve the objectives called for in the Affirmative Action Plan and report performance quarterly.
M2: **MAXIMIZE THE RETURN ON BART INVESTMENTS IN PROPERTY, RIGHTS-OF WAY, AND FACILITIES.** G9: Increase system utilization by promoting BART travel for all purposes, with special emphasis on offpeak and reverse commute trips. G10: Maximize the contribution to operating costs from passenger revenues, consistent with reasonable fare levels, to achieve a farebox ratio above 50%. G11: Develop station area sites for the realization of increased patronage and revenues, and to enhance the communities BART serves.	**MARKETING** 9. Complete Regional Transit Information Centers at 12 BART stations by June 30, 1989 10. Complete key research projects to provide basis for updated marketing strategies. 11. Review existing service patterns and develop new or improved service options for implementation during FY 88/89. 12. Reach and maintain 150 offsite ticket outlets at banks and retail establishments available to the general public, in addition to employer distribution program, with adequate coverage throughout the District. **JOINT DEVELOPMENT** 13. Complete station plans for Rockridge, Hayward, El Cerrito del Norte, and Bay Fair by June 1989. 14. Execute a minimum of one ground lease by June 1989 in concert with ongoing joint development marketing efforts. 15. Work to achieve not less than 15% equity participation in District Joint Development Projects by women and minority individuals and/or disadvantaged business enterprises.
M3: **EXPAND BART'S SERVICE AREA TO BECOME THE OPERATOR OF AN INTEGRATED REGIONAL TRUNKLINE TRANSIT SYSTEM WHICH EFFECTIVELY SERVES INTERESTED COUNTIES IN THE BAY AREA.** G12: Extend BART trunk lines within Bay Area travel corridors where feasible and in support of regional land use policies.	**EXTENSIONS** 16. Complete the Alternatives Analysis/Draft Environmental Impact Statement/Final Environmental Impact Reports and Locally Preferred Alternative Reports for both Pittsburg-Antioch and Fremont-South Bay Corridors. 17. Complete the Dublin/Pleasanton Extension Draft Environmental Impact Report. 18. Complete the advance acquisition of at least three extension land sites.

Figure 3
BART POLICY FRAMEWORK
FY 1988/89 PERFORMANCE INDICATORS AND STANDARDS*

SERVICE DEMAND

1. Achieve ridership projections as follows (in 1,000s):

	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	FY 1988/89
TOTAL TRIPS	14,838.1	14,673.5	14,737.2	15,120.9	59,369.8
AVERAGE WEEKDAY	202.5	200.7	204.3	207.0	203.6

SERVICE DELIVERY

2. Make available 85% of A- and C-cars and 90% of B-cars for revenue service by 4 a.m.

3. Provide service such that no more than 3% of peak period trains experience a primary delay exceeding 5 minutes and no more than 8% experience a delay from any cause exceeding 5 minutes.

4. Operate weekday peak period transbay service in the peak direction providing at least 97.5% of scheduled **CAR THROUGHPUT**.

5. Provide capacity where possible such that the load factor at the maximum load point for each train which can be lengthened or shortened (consists between 3 and 10 cars) shall average 1.00 during peak periods and not exceed 1.00 on average in the offpeak.

6. Conduct operations such that 94.0% of all **PATRON TRIPS** are completed **ON-TIME**. Also report weekday peak period performance.

7. Continue to provide an environment for patron circulation within stations and in trains such that the accident rate does not exceed 17.7 per million passenger trips.

8. Maintain the **AFC INCIDENT RATE** at or below 0.30 incidents per 1,000 passenger trips.

9. Maintain 96.0% availability for elevators and escalators.

10. Maintain express bus on-time performance such that 95.0% of all runs arrive at their final destination within 5 minutes of schedule.

PRODUCTIVITY & EFFICIENCY

11. Achieve a **FAREBOX RATIO** no less than 49.6% for **RAIL OPERATIONS**, 10.6% for express bus operations, and 45.9% for systemwide operations.

12. Achieve a **SYSTEM OPERATING RATIO** of no less than 48.5%. (See "A Special Note," p. 9)

13. Achieve a **RAIL COST PER PASSENGER MILE** of 21.8¢ or less.

14. Achieve a level of service output such that 16,047 vehicle miles are produced per equivalent District employee (based on 2,000 hours worked including overtime, and excluding capitalized and reimbursable labor hours).

15. Improve system utilization (passenger miles per seat mile) to 32.5% through continued monitoring of train capacity to match passenger demand patterns and attracting reverse commuters.

16. Reduce the total annual amount of employee lost time due to industrial injuries as a percent of time worked to 0.50% or less.

17. Maintain a paid sick leave rate of no more than 3.50%.

18. Work to maintain 21% disadvantaged business enterprise participation for all District contracts determined to have DBE opportunities, including 21% DBE participation for all Federally assisted contracts awarded during the year.

* **KEY INDICATORS** are denoted by bold face capital letters.

performance and provide answers to basic but very important questions such as: How many people ride? How good is the service? How productive is the organization? BART places great emphasis on knowing the demand for its product, the product's quality and how it can be improved, and the effectiveness of its production. Answers to the "how many?, how good?, how well?" questions yield this information. The importance of these questions, in conjunction with their unique influencing factors, has led to the adoption of this framework for presenting BART's 1988 Five Year Plan. Accordingly, all of the performance indicators have been grouped as to: service demand, service delivery, and productivity and efficiency. These headings also serve as the titles for the first three chapters. The fourth and final chapter is entitled Five Year Financial Plan.

THE PLAN. . .AN OVERVIEW

The 1988 Five Year Plan is presented in four chapters. The first, **BART SERVICE DEMAND,** focuses on the **CUSTOMER:** past, current, and potential. This chapter highlights ridership trends and describes the key factors that have affected BART's market share. Current conditions and assumptions about the future are identified, including consideration of extensions in terms of what the future system might look like and its ridership potential. Specific actions to be taken for realizing a greater market share are called out, including consideration of parking and other enhancements affecting how easily people can access the system.

The focus of the second chapter, **BART SERVICE DELIVERY,** turns to aspects of the **HARDWARE** as related to system reliability and capacity. How well trains and vital station equipment perform are looked at, as are the limitations which affect how much service can be provided. This includes limitations on train capacity, what problems are involved, what the realistic service potential appears to be, and what BART is doing to work toward this potential. A highlight of this chapter is the Capacity Expansion Program which is BART's strategy for overcoming systemwide capacity constraints. Rail extensions are brought into this discussion in relation to the current system, how they fit, and what actions are likely to take place within the current five year timeframe. Other aspects of service delivery discussed in this chapter include programs which address safety, station escalators and elevators, automatic fare collection equipment, and BART express bus service.

The third chapter, **PRODUCTIVITY AND EFFICIENCY,** looks at how BART manages its **PEOPLE** and **EQUIPMENT** and their combined effectiveness as related to service production, revenue generation, and cost control. A review of past efforts to increase productivity is presented along with an identification of key influencing factors. BART's strategy for improving productivity and efficiency is highlighted, and the supporting programs and capital projects planned for implementation are identified. This includes consideration of reducing expenses through privatization of selected activities, increasing revenue through joint development, concessions, lease opportunities, and developing a workforce ethic based on motivation to provide the best service possible.

How much it will cost and where the money will come from are the subjects of the final chapter: **FIVE YEAR FINANCIAL PLAN.** The discussion first focuses on BART's **OPERATING BUDGET.** Key factors and assumptions about the future are identified. This includes considerations of passenger and other revenue, and of labor and non-labor expenses. Assumptions are also outlined for key sources of financial assistance. Based on the assumptions for expense, revenue, and financial assistance, a five year operating budget is presented. Funding shortfalls are called out and prospective measures for balancing the budget are identified. BART's **CAPITAL BUDGET** is presented last. The cost for capital replacement and improvements are identified. Funding sources and amounts by source are projected, and an assessment of funding adequacy is made, along with the impact of a shortfall on BART's capital improvement program.

A SPECIAL NOTE

BART's Five Year Plan is many things to many people. To some, it's a source of technical information. Others are interested primarily in issues and policies, while still others just want to find out how BART is doing and what the future holds. This year's Five Year Plan tries to accommodate all these needs. Every attention has been given to presenting the information clearly, accurately, and completely. Key points appear in **bold** type. BART's mission, goals, program objectives, and performance indicators appear in **bold** type and are underscored.

As this is a living document, it incorporates information available at the time of its writing. Most significant in this respect is the **use of the FY 1988/89 Interim Budget as the starting point for the five year financial projections in this edition.** (After labor negotiations are complete and new contracts are signed, it is anticipated that the FY 1988/89 budget will be revised, with corresponding changes in District objectives, and include an operating ratio of at least 50%.) Also, note that the **evaluation of performance toward FY 1987/88 objectives reflects data through March 31, 1988.** The Fact Sheet inside the front and back cover, however, presents data through June 30, 1988 for FY 1987/88.

In addition, the projected start dates for new service increments are dependent, in large part, on the C-car delivery schedule. Delivery has been delayed recently because of labor problems at the manufacturer's plant in France. The C-car delivery dates shown in Figure 15 will be revised after resumption of normal production. **New service start dates throughout the document are consistent with those in Figure 15 which reflect project implementation status as of March 1988 and correspond to the ridership and financial projections. These target dates, however, may be altered by changes in project completion schedules.** Finally, for planning purposes, a **12.5% fare increase beginning in March 1990 is included in the financial projections.** If this were to occur as assumed, the fare increase would precede the service change scheduled for July 1990.

Note that a quick reference guide has been included at the beginning of each chapter which outlines the topics covered and presents key chapter highlights. This reference guide also points the reader to reports, studies, plans, and other documents which contain more detailed information. Selected source documents have been compiled into a separately bound **APPENDIX.** This consists of the updated BART Maintenance Plan, the District's adopted Private Sector Participation Policy and Procedures, and public comments on the draft version of this Plan along with BART responses. Other documents not found in the Appendix may be requested through BART's Office of Research. The reader should also be aware that BART's **CAPITAL IMPROVEMENT PROGRAM,** a companion document to the Five Year Plan, is also available in a separately bound 1988 edition and is the single most important source of information for BART's five year capital program.

CHAPTER ONE:

BART SERVICE DEMAND

- BART Customers And Those Who Could Be
- Ridership Trends. . .Lessons From The Past
- Today's Challenges And Tomorrow's Targets

BART SERVICE DEMAND

HIGHLIGHTS

- Making BART more convenient is one way to make the system more attractive to current customers and to prospective customers in BART's untapped market which is estimated to be on the order of five times current use.
- Two 7-year ridership growth periods have occurred, each characterized by five years of healthy gain followed by two years of decline.
- Demand for BART increases in response to new and better service and more capacity, and decreases when reliability is inconsistent, capacity insufficient, and fares are raised.
- Dependence on automobiles for getting to suburban stations continues to exert pressure for more parking at stations and will become more acute with the implementation of higher train frequencies. BART will add 499 new spaces in FY 1988/89, with 7,245 more spaces programmed for completion at existing rail stations by June 1993.
- BART ridership is projected to grow at an average rate of 2.8% annually for the next five years to 66.2 million trips for FY 1992/93 (or 231,000 per average weekday), including the impact of an assumed 12.5% fare increase effective March 1990.
- Restructuring of AC Transit bus routes, major reconstruction of freeways, higher gasoline prices, and continued regional growth point to greater demand for BART service.
- BART's strategy for promoting additional system use includes placing additional emphasis on service, a marketing program based on information dissemination and incentives, improving station access, increasing station attractiveness through joint development and concessions, and the continuing pursuit of rail extensions.

PERFORMANCE INDICATORS

- Average weekday ridership (Key)
- Total ridership (Key)

REFERENCE DOCUMENTS

- BART Passenger Profile Survey (1987)
- BART Latent Demand Study (1983)
- BART Patronage Study (1986)
- Survey of BART Fast Pass Patrons (1987)
- BART Monthly Patronage Report
- BART Quarterly Performance Report on System Objectives
- BART 1988 Capital Improvement Program
- BART Extensions Summary

Progress for BART means serving people better; better than a decade ago, better than last year, better than yesterday. This requires knowledge of who uses BART. . .and why. Equally as important is finding out why people who could use the system. . .don't. **Progress is based on the pursuit of opportunities.** At BART, identifying opportunities begins with asking people what they think about the service, finding out about customer needs as well as the needs of those who would like to use the system. The Five Year Plan is based on this understanding, an understanding which gives rise to programs and projects aimed at making the system more useful to more people.

BART CUSTOMERS. . .AND THOSE WHO COULD BE

Anyone who lives, works, or plays in the Bay Area could use BART. Of course, the location of the system makes it easier and more practical for some to use than for others. But even for the occasional trip to San Francisco or other destination on the system, BART is there to serve. It's a public conveyance, a way of going someplace. **To two-thirds of BART's current riders, that "someplace" is work; to 15% it's personal business; and to 11% it's school.** These figures come from the 1987 BART Passenger Profile Survey, the tenth in a series of surveys conducted since 1973 which contain information about BART customers. This latest survey indicates BART riders typically:

- Access their station of origin during peak periods by car (52%), walking (27%), and local transit (19%).
- Leave their station of destination during peak periods by walking (74%), local transit (14%) and car (11%).
- Make a round trip on BART (82%).
- Could have used a vehicle available to them for the same trip made on BART (44%).
- Use BART every weekday (63%).
- Have used the system more than 3 years (58%).
- Believe BART delivers them on-time at least 90% of the time (67%).

These are just the highlights of in-depth periodic surveys BART conducts of its customers, users of the system who currently generate about 200,000 trips each weekday. An important point these surveys demonstrate is that **people who use BART are, for the most part, satisfied with the service for their selected travel purposes.** The system plays a part in their lives by satisfying some of their mobility needs. For frequent BART customers, this includes both the journey to work as well as other purposes. Less frequent BART users look to the system for very specific kinds of trips. For these system users, this may include such purposes as attending a sporting event or concert at the Oakland Coliseum, or going on a Saturday outing in San Francisco.

A second important point the Passenger Profile Surveys show is that when all factors are considered, **convenience, more often than not, will tip the scale in a person's decision to use or not use BART.** Making BART more convenient is one way of making the system more attractive to people who are customers now, as well as attracting others who could use the system but presently don't. As with any product, this greater attractiveness leads to greater demand and, for BART, demand means filling trains and recovering a greater portion of operating expenses from fares.

What about those people who could ride BART, but don't? How many potential new customers are there? Why don't they use the system? What would it take to attract them? To help answer these questions BART conducts its Latent Demand Study, the sixth and most recent of which took place in 1983. One highlight of this last study, and perhaps the most widely publicized finding, is that **BART's potential commuter market is on the order of 462,000 people** -- people who live within three miles of a station and commute at least five miles to a job location that is within walking distance or short bus ride of a station. Since this survey was conducted, significant numbers of jobs have been relocated away from the central cities to suburban locations. A survey of downtown San Francisco workers is planned for 1988 to measure the current market and learn more about commuter service requirements.

The 1983 Latent Demand Study found that non-users' perceptions tended to be governed by limited knowledge which led to their decision not to use BART. For example, non-users were generally unaware of the cost to ride BART and of printed train schedules which BART publishes.

This study suggests that a **sizable portion of BART's untapped market is lying dormant for want of the most basic kind of information:** At what time and how often do trains run? How long does the train take? How much does the ride cost? There are, of course, very legitimate reasons why people don't ride BART, which are not based solely on schedule and fare information or how reliable the service is. The Latent Demand Study calls out these important considerations, attributes of BART that figure in the total equation of whether or not a person uses the system, or in the case of current customers, how often. These considerations include specific aspects of BART as related to parking, local bus connections, and personal safety, particularly in parking lots and while waiting for a bus outside stations.

Another important aspect, one which cannot be underestimated, is **how people feel they are treated** from the time they enter a station to the time they clear the gates at their destination station. Is there a feeling that BART has a human touch, where a behind-the-scenes and front-line workforce help people and deliver a quality product? Or, do customers feel "they're on their own," at times held captive and at the mercy of impersonal mechanical devices? The 1983 Latent Demand Study said **BART could do better.** This finding, along with others from this study and the Passenger Profile Survey, help BART to uncover areas needing attention and discover new opportunities, for today's customers and for the many more who will be tomorrow.

RIDERSHIP TRENDS. . .LESSONS FROM THE PAST

Demand for BART service is sensitive to many factors. Some BART can control. Examples of these include the considerations which were discussed in the previous section, such as schedules, fares, reliability, safety, station accessibility, and customer information. Clearly, these factors lie within BART's domain. **Other factors lie outside BART's direct control.** Examples of these are gasoline prices, roadway conditions, housing and job markets, connecting transit services, and even the weather. At any point in time, the unique mix of these and other factors determines the level of demand for BART. Travel preferences can shift quickly to BART's main competitor, the automobile. Therefore, attention to controllable factors is essential.

How has BART ridership grown since the system opened in the Fall of 1972? Are the effects of demand-influencing factors readily apparent? To answer these questions, turn to the graph in Figure 4 which tracks each year's average number of BART trips taken on weekdays. The overall trend is healthy year-to-year increases in ridership except for two periods. Beginning with the first year of operation in FY 1972/73, **the historical pattern is a seven year period repeated twice: five years of growth followed by two years of decline.** A variety of factors helped shape these periods of growth, reflecting different phases in BART's development and corresponding ridership response.

*** The First Seven-Year Growth Period ***

BART ridership climbed steeply between opening day in September 1972 and two years later when transbay service was inaugurated. **The opening of BART's transbay tube** ushered in a new travel era by providing an alternative to the Bay Bridge, the most heavily used highway link in the Bay Area. BART ridership jumped from an average of 69,000 weekday trips in August 1974 to 120,000 in October 1974, the first full month of transbay service.

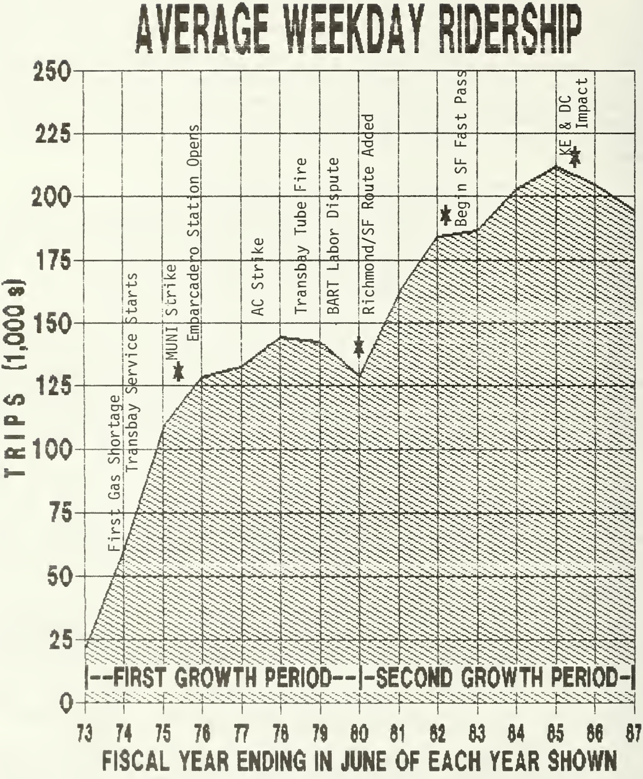
BART ridership continued to grow but at a slower rate in the year following FY 1974/75. Important events which affected the growth rate in FY 1975/76 included BART's first **fare increase** (in November 1975), the addition of **night service,** the opening of Embarcadero Station (May 1976), and a two-month San Francisco Municipal Railway **(MUNI) strike.** Compared to prior year increases, BART ridership grew only about 3% between FY 1975/76 and FY 1976/77. The following year saw an upturn for a 9% gain as a two month Alameda-Contra Costa County Transit **(AC Transit) strike** channeled new customers to BART.

A low level of train reliability began to exert increasing influence on the demand for BART service beginning in FY 1975/76. During the first two to three years of operation, BART customers were tolerant. As time went on, recurring problems caused **less than acceptable ontime performance.** BART staff, recognizing the technical problems, began a program to improve train reliability. The full impact of the Reliability Improvement Program, however, would not be realized until late 1980.

Two major events occurred in 1979 which had a severe impact on BART ridership. This is seen as the first downturn in Figure 4 as noted for FY 1978/79 and FY 1979/80. The first event was **a fire in the transbay tube** in January 1979. This resulted in an almost three-month closure of the tube and system use dropped from about 150,000 weekday trips to 110,000. During this time, limited train service was operated in the East Bay and San Francisco, with substitute bus service established via the Bay Bridge for transbay travel.

A second event in 1979, which had an even greater impact on ridership than the transbay tube closure, was a **BART labor dispute.** This began to affect train operations before mid-1979 and ultimately led to the curtailment of service for three months that fall. As a result BART customers had to find other ways of making the trips they formerly made by train. Concurrently, world

Figure 4



Fare increases are denoted by asterisks (*).

events led to a second **gasoline shortage** (the first shortage took place in early 1974). This placed added emphasis on the use and need for energy-efficient mass transportation. What ridership gains were made as the result of the gasoline shortage, however, were more than offset by the effects of the transbay tube closure and the BART labor dispute in the final months before the June 1979 contract expiration. The net result of these events was that BART ridership declined about 1% between FY 1977/78 and FY 1978/79. Then, train service was greatly curtailed during the work stoppage between Labor Day and Thanksgiving 1979. Accordingly, weekday ridership for FY 1979/80 dropped 10% from the year before. Nevertheless, **from 1974 to 1980, patronage grew almost 5% per year on average.**

Over the course of the first seven year period, another factor greatly influenced BART service demand: **capacity.** As ridership increased sharply, it became apparent that system constraints preventing BART from delivering more service needed to be lifted. This meant reducing headways, thereby allowing trains to operate at greater frequency. This also meant procuring more cars to form more trains. The seeds of BART's **Capacity Expansion Program** were sown during these early years, seeds which are just now beginning to yield fruits of many years' labor.

*** The Second Seven-Year Growth Period ***

For somewhat different reasons, the second seven-year growth period almost mirrors the first: five years' net increase of about 80,000 average weekday trips followed by two years' net decrease of about 15,000. During the first period, increased demand for BART followed new service and capacity additions within very congested travel corridors. At the start of the second period, a similar **ridership increase was triggered** when BART's Reliability Improvement Program made possible direct service on the Richmond/Daly City route. This additional capacity, along with a **doubling of train ontime performance** from about 45% in FY 1978/79 to just over 90% in FY 1980/81, provided important **marketing advantages** for BART. People who were already riding the system noticed the difference. Trains ran more frequently. Delays were fewer. The news spread. The two-year ridership decline ended.

Within the next five years, BART ridership shot up and peaked at an average of 211,600 weekday trips for FY 1984/85. This occurred despite two fare increases, one in July 1980 and another in September 1982. Growth during this second period exceeded that of the first. **Ridership expanded 5.3% annually from 1980 to 1985,** including the effect of the 1982 fare increase. BART now had a quality product to sell. This ushered in a **more aggressive approach to marketing.** Greater use was made of advertising. Increasingly, BART began to be promoted as a way of going to major special events. Not only did BART's commute traffic pick up but so did that for the midday, night, and weekends. More and more people considered BART as good for going to the ballgame or parade as for going to work.

BART's emergence in the early 1980s as a dependable means of transportation pumped **new interest into extending the system.** The region as a whole was experiencing considerable growth, which at the time was accelerated by the dominance of Silicon Valley as the world center of the semiconductor industry. To BART, extensions represent a way of tapping new markets by serving areas where rail transit makes sense. To the Bay Area, BART is a means of providing regional mobility to many without having to pave over more of the landscape with new and wider highways.

As ridership grew in the early 1980s, **lack of station parking became more of a problem** for BART customers and a deterrent for would-be riders. Because of high dependence on cars for access to stations in outlying areas, BART customers began to notice increased difficulty of finding a parking space. BART had 20,500 parking spaces in July 1980, at the very beginning of the second growth period. Surveys taken at that time show that station parking was 94% filled by noon on weekdays. Parking capacity lagged far behind demand. Today, BART has 26,300 spaces at 24 of its 34 stations, or 5,800 spaces more than eight years ago. Most station parking lots, however, still fill during the morning commute period. This seriously limits midday station accessibility when ample rail capacity is available. If the past offers any clue as to what the future may hold, BART **can expect new parking capacity to be quickly consumed as more people are attracted to the soon-to-be implemented new train service.**

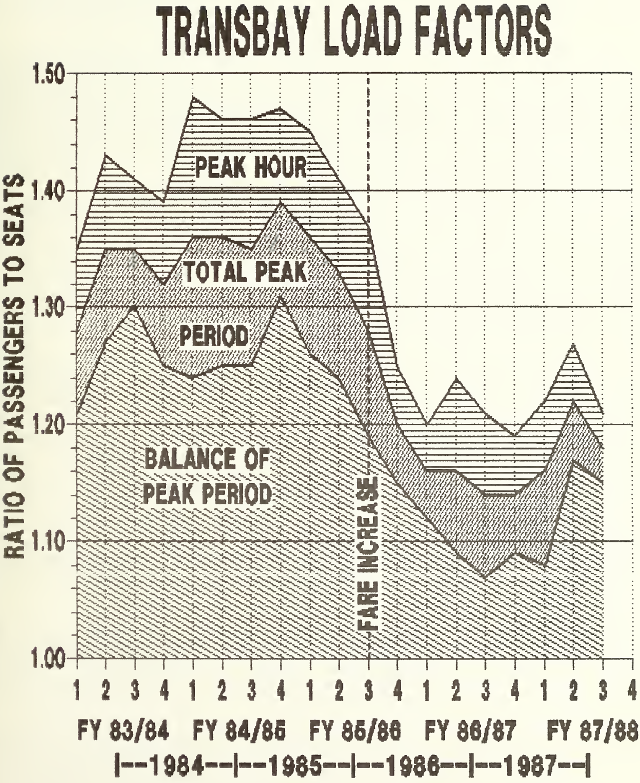
Despite these constraints, demand for BART service remained strong through FY 1984/85. A fare increase in September 1982 slowed ridership growth, but only temporarily. A 2% gain was realized between FY 1981/82 and FY 1982/83. The following year weekday ridership shot up almost 9% from 186,300 in FY 1982/83 to 202,500 in FY 1983/84. Contributing to this increase was the acceptance of the **MUNI Fast Pass** as fare payment on BART for travel within San Francisco. This joint project included a revenue-sharing agreement and modification of BART's faregates to accept the pass. Beginning in April 1983, BART had a lot of new customers, people who formerly rode parallel MUNI surface routes with Fast Passes. BART's travel-time advantage was substantial. The fact that people now had BART as a "free" option, made the Fast Pass and BART all the more appealing. The first six months of Fast Pass use on BART averaged about 15,000 weekday trips. Today, five years later, the figure is twice that. The success of the combined BART/MUNI Fast Pass demonstrates the effect of another important factor which has influenced BART demand: **coordination of transit fares, schedules, and transfers.**

During the fifth year of the second growth period, ridership went up more than 4%, from 202,500 in FY 1983/84 to 211,600 in FY 1984/85. This is the highest annual average weekday ridership BART has ever achieved, one which peaked in April 1985 at just over 216,100 weekday trips.

By mid-1985, ridership growth seemed to stop. Month-to-month averages hovered around 214,000 between February and September. A noticeable dip followed in October. What was happening? Were five years of growth drawing to a close or just taking a pause? Looking back, two things seemed to be working against BART. The first was **limited capacity.** With BART's entire fleet pressed into service, train loadings had nowhere to go but up as ridership increased. Figure 5 shows this. All during FY 1984/85, transbay trains in the peak commute hour, on average, carried just under 150 people for every 100 seats. The most heavily loaded train carried over 180 people for every 100 seats. The limit of BART customers' tolerance of train crowding seemed to have been reached, and no remedy was in sight. BART didn't have any more cars and the Capacity Expansion Program was still to be implemented.

The second factor limiting BART demand in 1985 was **service reliability.** A solid five year record of dependable train service was undermined by the very same projects BART needed to improve performance. Between July 1985 and January 1986, the final construction stages of the KE Track (the third mainline track and related train storage tracks in downtown Oakland) required

Figure 5


TRANSBAY LOAD FACTORS
RATIO OF PASSENGERS TO SEATS
1.50
1.40
1.30
1.20
1.10
1.00
PEAK HOUR
TOTAL PEAK
PERIOD
BALANCE OF
PEAK PERIOD
FARE INCREASE
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 83/84 FY 84/85 FY 85/86 FY 86/87 FY 87/88
|--1984--|--1985--|--1986--|--1987--|

manual train operation over a very complex part of the system where three routes merge. Measures were taken to minimize the impact, but BART customers noticed the difference. Trains ran slower through the construction zone, and stop-and-go action under manual train control did not provide the customary smooth ride. A construction stage for a second Capacity Expansion Program project, the Daly City Turnback, also impacted BART's ability to deliver its scheduled service. Between August 1985 and April 1986, each of the three train berthing platforms at Daly City Station had to be rotated out of service as part of this construction.

In retrospect, it is clear that limited capacity and service reliability problems put a definite end to five years of ridership growth. **A special study conducted in late 1986 showed that after the fare increase, more commute riders abandoned the system than those who rode midday, at night, or on the weekend.** This went against past experience with fare increases, not only for BART but for the entire transit industry, which experiences greater losses of offpeak riders when fares are raised.

BART's patronage erosion as the result of higher fares was virtually as expected, 8% actual versus 7% predicted. The lack of growth after the one-time drop, however, was unexpected. Other factors appeared to have inhibited a recovery. One of these factors is the **shift in the job market** from downtown to suburban locations. Firms which relocated large numbers of employees from San Francisco included Chevron, Bank of America, Pacific Telephone, and Fireman's Fund. This outmigration of jobs began to be noticed about the same time BART ridership peaked in mid-1985.

A second factor the 1986 Patronage Study found which also worked against a ridership recovery was the **growing popularity of casual carpooling.** AC Transit first noticed this as an imbalance in its transbay ridership. Buses tended to carry more people out of San Francisco in the afternoon commute period than they did going into the City in the morning. The "lost riders" were found neatly lined up each morning at key transbay bus stops in Oakland and Berkeley. These locations became the staging grounds where people waited, not for buses, but for free rides with lone drivers who, with 3 or more occupants, could bypass the very congested approach to the Bay Bridge and avoid the 75¢ one-way toll. BART soon developed an imbalance in transbay ridership. Orinda Station became another staging ground for casual carpooling. This impacted BART customer parking which was being consumed by carpoolers who would drive to Orinda Station, park, and then ride with someone else by car to San Francisco.

Other factors examined in the 1986 Patronage Study were **gasoline prices,** which fell significantly with a drop in world oil prices in early 1986, and **fraudulent use of the BART/MUNI Fast Pass.** The Study attributed less impact on BART ridership to these factors than the January 1986 fare increase, the job market shift, or casual carpooling.

By Spring 1986, train service reliability returned to favorable levels following completion of the KE Track and the mainline tie-in phase of the Daly City Turnback. Additionally, BART has taken measures since the 1986 Patronage Study to control Fast Pass abuse by transbay riders and casual carpooling at Orinda and Lafayette stations. **Ridership has maintained a relatively flat profile since the fare increase at around 195,000 weekday trips, and is only just now showing signs of a sustained upswing.**

In summary, **the main lesson derived from analysis of the two seven-year growth periods is that service availability and reliability are essential to the continued expansion of BART ridership.** Growth cannot occur without sufficient capacity. Service interruption or reduction has been a prime cause of past downturns in BART ridership. Given the variety of external factors which can negatively impact system use, BART must try to avoid any actions within its control which may decrease patronage.

TODAY'S CHALLENGES AND TOMORROW'S TARGETS

BART faces a number of challenges in terms of increasing the demand for its service. The strategy for dealing with each draws from what's been tried, what's proven successful, and what's new and promising. As housing satisfies the basic human need for shelter, transportation fills the same role with regard to mobility. Because of this, BART will always have a potential market for its service. However, progress requires action to cultivate what is potential into what is real. It follows that BART's strategy for realizing more of its potential is through well thought out programs and projects which, when taken together, **tailor BART service to better fit customer needs.**

How well BART is doing in terms of stimulating demand for its service is measured by two **performance indicators,** both of which are key indicators. The first is **average weekday ridership,** the common denominator for comparing actual BART ridership to forecast as well as comparing BART ridership to other transit systems. The second performance indicator for service demand is **total ridership.** This measure accounts for all BART travel, that occurring on weekends and holidays as well as weekdays. This indicator is directly linked to passenger fare revenue and, as such, is an important budget consideration.

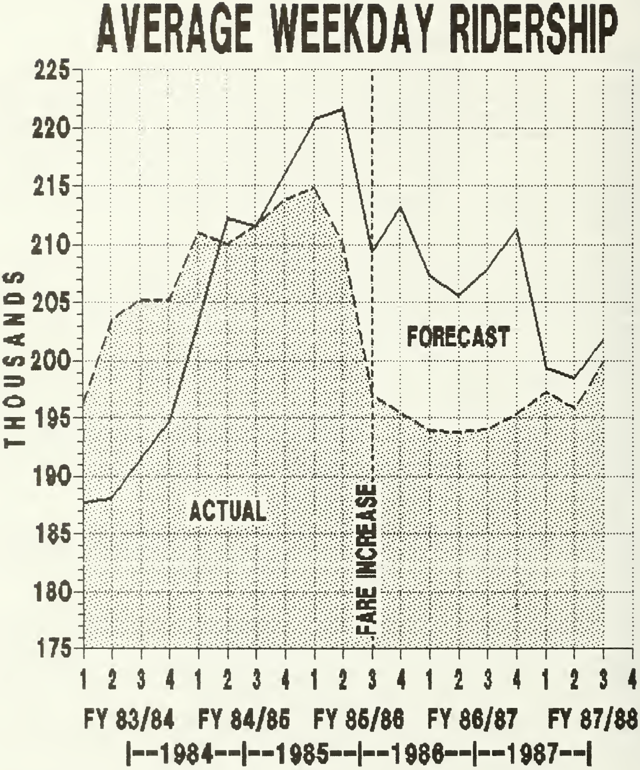
The 1988 update of BART's five year patronage projections closely resembles the 1987 five year forecast. The underlying methodology is unchanged; the current projections differ from last year's only because of changes in assumptions regarding the timing of new service increments and a possible fare increase. No other new information which would change the forecasting process is available or considered directly relevant.

Ridership generally followed the trend projected a year ago, with patronage for FY 1987/88 at 98.7% of forecast. A small but noticeable upswing is apparent in Figure 6, which shows actual and projected average weekday ridership for the last five fiscal years by quarter.

The FY 1987/88 forecast anticipated a greater response to the **$35 high-value ticket promotion** between September and December 1987 than apparently occurred. Ridership levels seem to be holding firm after the promotion, however, indicating that riders continue to be generally indifferent to this price change. The forecast also assumed that **delivery of C-cars** would permit the lengthening of some trains and the consequent reduction of peak load factors. Introduction of these cars has been delayed six months. Ridership increases may continue without this additional capacity as indicated by the recent upturn in load factors in Figure 5.

The two main factors on which BART's current five year patronage forecast is based are expansion of peak period capacity and overall expansion of the

Figure 6



AVERAGE WEEKDAY RIDERSHIP
THOUSANDS
225
220
215
210
205
200
195
190
185
180
175
FORECAST
ACTUAL
FARE INCREASE
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 83/84 FY 84/85 FY 85/86 FY 86/87 FY 87/88
|--1984--|--1985--|--1986--|--1987--|

population and employment of the region. **At current fares, continuing regional growth is expected to sustain a 2.5% yearly increase in offpeak riding and a 2.7% annual growth in peak demand, with the exception of transbay routes during the peak hour.**

Future demand for transbay peak hour service is projected to respond to planned capacity expansion in much the same way that was observed between 1982 and 1985. During that period, trains which could be lengthened to maintain low to moderate load factors experienced more growth than those which were more heavily loaded. This ridership growth was used to project future demand response to longer and/or additional trains, which will reduce load factors in the same way as occurred previously. Projections for the upcoming five year period for total annual trips and average weekday trips are shown in Figure 7. The timing of planned service improvements is as shown in Figure 15 which will be discussed in detail in the next chapter.

Given the large financial deficits anticipated in both the 1987 plan and this update, **a 12.5% fare increase** effective March 1990 is assumed for planning purposes. This increase is in line with growth of the cost of living and should help offset part of the projected deficit.

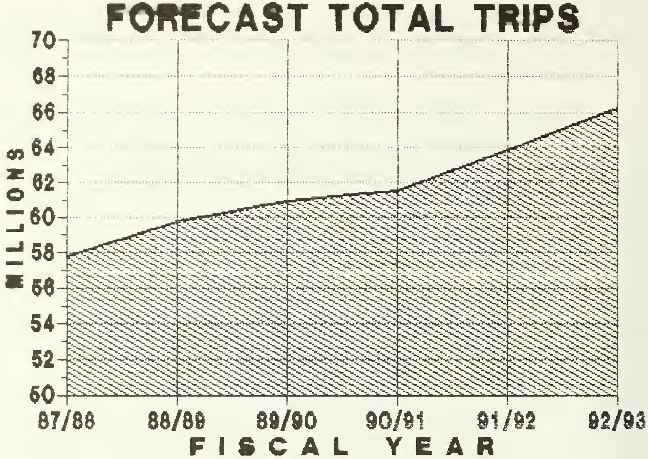
What other factors may impact BART's future demand? The forecast assumes that **service reliability will continue** at the level provided during 1986 and 1987, as service is expanded. The discussion above showed the importance of reliability. Other factors that should support the projected increase in demand include: **additional BART parking, a possible introduction of a second** generation **AC/BART Plus** ticket to improve transfer convenience, **restructuring of AC Transit** bus service to improve access, **increased freeway congestion** during highway reconstruction and expansion projects, and likely **increases in gasoline prices.**

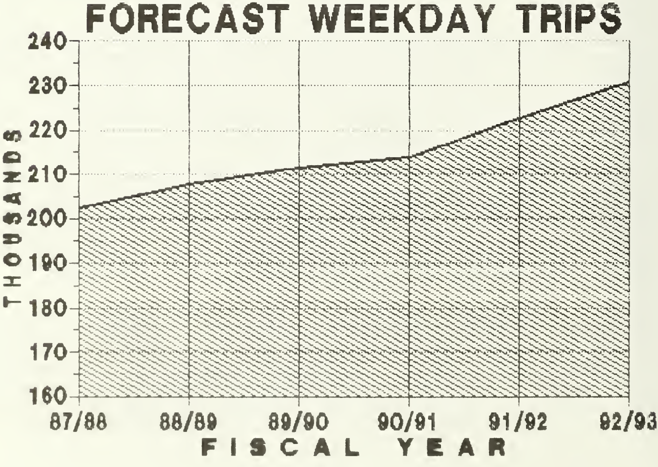
Two developments are hard to gauge, but could reduce the rate of growth of demand for BART. Relocation of employment from central areas to suburban locations seems to have impacted BART ridership since 1985, although conclusive data are not available to indicate by how much. **Job relocation will probably continue;** the key unknowns center on whether the rate of such relocations will continue or decline, and what type and number of jobs will occupy the offices vacated by relocating firms.

Lifestyle changes offer another challenge to BART. These include casual carpooling, computer-based communication systems offering the possibility of working at home, and the possibility that the number of women entering into the workforce may have peaked causing employment growth to slow. These and other related factors are largely beyond BART's ability to control or even significantly influence. Such factors will need to be monitored carefully so that their impact can be anticipated in future plans.

The challenges BART faces with respect to advancing the system in step with its ridership objectives and other policy elements lie on a series of fronts. For BART, front line actions correspond to sets of activities which describe program areas. Accordingly, **the strategy for realizing a greater share of BART's market** is presented in the following sections by program area. Additional details for individual capital projects are contained in BART's 1988 Five Year **Capital Improvement Program,** which is under separate cover.

Figure 7


FORECAST TOTAL TRIPS
MILLIONS
70
68
66
64
62
60
58
56
54
52
50
87/88
88/89
89/90
90/91
91/92
92/93
FISCAL YEAR


FORECAST WEEKDAY TRIPS
THOUSANDS
240
230
220
210
200
190
180
170
160
87/88
88/89
89/90
90/91
91/92
92/93
FISCAL YEAR

*** Capacity and Reliability ***

The demand for BART service has repeatedly been shown to be strongly influenced by system capacity and service reliability. This direct linkage and the need for improvement are the cornerstones of **BART's Capacity Expansion Program** which is to be fully in place by mid-1990. New train service, which has already been added under this program, will continue to be phased in over the next two years. (Details of individual capacity expansion projects and their implementation are presented in the next chapter which covers service delivery.)

What BART riders will see and what will be the focus for attracting new customers is **more frequent and reliable service.** By mid-1990 the completion of the Capacity Expansion Program will allow trains to operate as close as 2-minutes 15-seconds apart. The merging of routes in downtown Oakland and the scheduling of trains through San Francisco require train spacing on any one route to be two to four times this headway. This translates to a range of possible headways for individual routes of between 5 and 15 minutes depending upon how available train "slots" are filled to meet varying demand. **By mid-1990, BART will be capable of providing 26 transbay trains per hour in the peak demand direction compared to 17 now.** Based on each route's current service and projected new demand as shown in Figure 8, afternoon rush-hour transbay BART service could consist of:

- 11 Concord trains versus 7 now departing San Francisco.
- 9 Fremont trains versus 6 now departing San Francisco.
- 6 Richmond trains versus 4 now departing San Francisco.

The current maximum frequency of 5 trains in the peak hour on the Richmond/Fremont route is not expected to change during the next five years. This is based on this route's current demand and corresponding train lengths which are well below the allowable ten-car limit. This means that additional demand for this route will be accommodated by lengthening already scheduled trains. **The C-car project is a key element for providing this needed capacity.**

More and better service means **less waiting** on the platform, **a better chance of getting a seat,** and a **more predictable travel time.** Over the course of the next two years, BART will be adding frequency and capacity to its current schedule as shown in Figure 9. The programmed service has been planned to both promote and accommodate a forecast of **233,800 average weekday trips by June 1993.** This increase is the result of current BART customers riding more often, as well as new customers who are attracted to BART because of added convenience and comfort afforded by the new service. (The details of new service plans are discussed in the next chapter.)

*** Safety ***

Safety is an undisputable requirement with which there is no compromise. BART will continue to aggressively pursue all it can do to maintain **high safety standards.** BART's insistence on favorable safety performance contributes to public confidence in the system, an attribute which works in favor of promoting increased ridership.

BART's safety department is involved in every aspect of service for which safety oversight is needed. This includes concern for how trains, elevators,

Figure 8

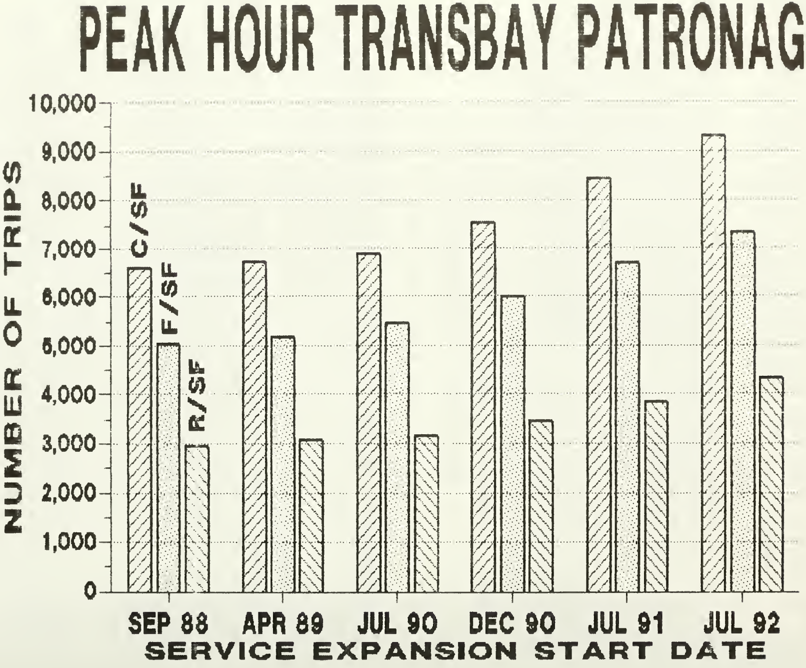
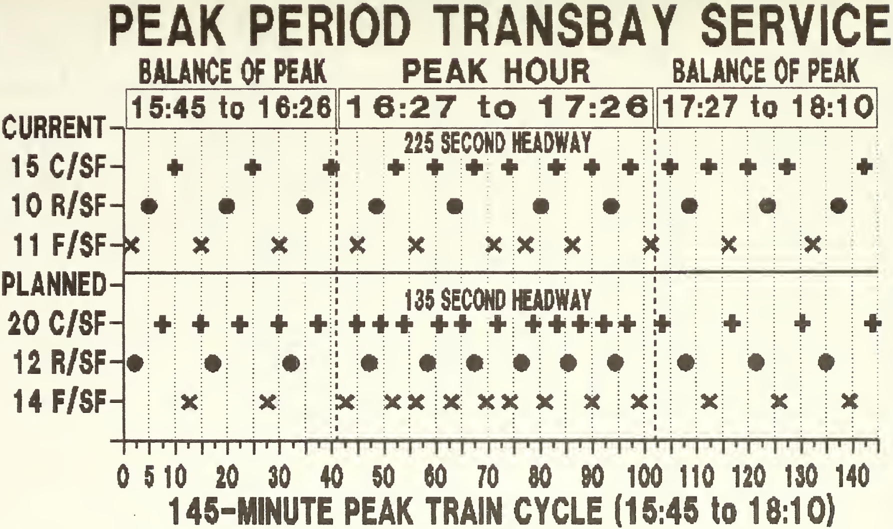

PEAK HOUR TRANSBAY PATRONAGE
NUMBER OF TRIPS
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
C/SF
F/SF
R/SF
SEP 88
APR 89
JUL 90
DEC 90
JUL 91
JUL 92
SERVICE EXPANSION START DATE

Figure 9



NOTES:

(1) Sequence starting at 3:45 PM from Embarcadero Station.
(2) Current and planned service for Richmond/Fremont is 10 trains.
(3) Throughput on Richmond/San Francisco equals one train more than on line due to shorter route and run time.

and escalators operate, and how passengers circulate on station platforms and stairways. The **emergency preparedness program** will continue to be the vehicle for coordinating BART's safety activities with those of local emergency providers (i.e., fire departments, first aid units, hospitals, etc).

With regard to security, BART will continue to deploy strategically its sworn police officers (130 currently) in the surveillance of trains, stations, parking lots, and other BART property. **Whether committed against customers or property, crimes on BART are a deterrent to system use.** If people feel unsafe, they may be less willing to ride. The establishment of BART Police Services in 1976 as a fully sworn law enforcement unit is evidence of BART's commitment to providing transportation that is both safe and secure.

*** Access ***

The easier it is to get to and from BART, the more people will ride. This philosophy has guided BART's access program which seeks to make it easier for people of all ages and physical capacities to come and go by bus, car, bicycle, wheelchair, or on foot. BART's access program also deals with the special mobility needs of elderly and handicapped customers' use of the rail system as well as BART express buses.

Adding new train service is, without a doubt, a key element needed for capturing a greater share of BART's market. But increased train frequency alone is not enough. For BART to become more useful to substantially more people, **improvements must focus on door-to-door travel time.** BART's access program can have a great influence on ridership. To take full advantage of the one-half billion dollar investment in increased service frequency and capacity, BART will be improving access by making the system more attractive in terms of the ease, time and cost of getting to and from stations.

Easier Access By Car: Past studies have shown the need for more station parking. The most recent study, which was conducted in late 1987, reveals that **over 4,500 BART customers park outside station lots due to lack of space.** This study also notes that parking restrictions have prevented more people from parking in neighborhoods near stations where local ordinances are in effect. The parking deficiency is most severe at the four outer Concord-line stations which fill before 7:30 a.m. These same four stations also account for about half of the 4,500 BART customer cars parked on neighborhood streets. Other stations which have comparable fill times and neighborhood impact are West Oakland and El Cerrito del Norte. Figure 10 summarizes **BART's parking expansion program which will add 499 new spaces by June 1989 and 7,245 more spaces by June 1993.** (For additional details concerning individual projects and costs, refer to BART's 1988 Capital Improvement Program.)

Easier Access By Bus: Opportunities for improving bus/rail connections which have the greatest potential for increasing ridership exist in the East Bay. This involves AC Transit which provides bus service to 20 of BART's 25 East Bay stations. BART is currently working with AC Transit on its route restructuring plan which they anticipate implementing over the next 5 years. Changing demand patterns for AC Transit service and the need to productively accommodate them require **more coordinated feeder service to BART** than presently exists. Bus routes will be oriented more toward serving BART stations as key destinations. Bus arrivals and departures will be scheduled so that connections to and from BART trains can easily be made. Improvements like this have already been made for some of Central Contra Costa County

Figure 10

BART-OWNED PARKING SPACE INVENTORY AND PROGRAMMED EXPANSION
PAVED FACILITIES AT EXISTING RAIL STATIONS AND EXPRESS BUS PARK/RIDE LOTS

(Status as of September 1988)

	STATION	SPACES AS OF JUNE 1988	PROGRAMMED ADDITIONS			PLANNED SPACES AS OF JUNE 1993
			FY 1988/89	FY 89/90 - 92/93	ADDED IN FIVE YEARS	
SAN FRANCISCO LINE:	Daly City	1,877	0	0	0	1,877
	Glen Park	55	0	0	0	55
	West Oakland	403	0	1,100	1,100	1,503
	SUBTOTAL	**2,335**	0	**1,100**	**1,100**	**3,435**
FREMONT LINE:	Fremont	2,374	0	0	0	2,374
	Union City	1,166	0	300	300	1,466
	South Hayward	1,252	0	0	0	1,252
	Hayward	967	0	950	950	1,917
	Bayfair	1,761	0	0	0	1,761
	San Leandro	1,226	0	0	0	1,226
	Coliseum	923	0	0	0	923
	Fruitvale	1,025	0	560	560	1,585
	Lake Merritt(a)	190	0	0	0	190
	SUBTOTAL	**10,884**	0	**1,810**	**1,810**	**12,694**
RICHMOND LINE:	Richmond	754	0	0	0	754
	El Cerrito del Norte	1,607	0	900	900	2,507
	El Cerrito Plaza	509	54	0	54	563
	North Berkeley(b)	636	140	0	140	776
	Ashby	560	0	0	0	560
	MacArthur	609	0	0	0	609
	SUBTOTAL	**4,675**	**194**	**900**	**1,094**	**5,769**
CONCORD LINE:	Concord	1,912	0	600	600	2,512
	Pleasant Hill	1,678	193	1,200	1,393	3,071
	Walnut Creek	1,263	0	1,135	1,135	2,398
	Lafayette(c)	1,446	0	0	0	1,446
	Orinda(c)	1,320	0	0	0	1,320
	Rockridge	776	0	500	500	1,276
	SUBTOTAL	**8,395**	**193**	**3,435**	**3,628**	**12,023**
TOTAL: RAIL STATIONS		**26,289**	**387 (b)**	**7,245**	**7,632**	**33,921**
BART EXPRESS BUS PARK/RIDE FACILITIES:						
	North Concord/Martinez	538	0	0	0	538
	West Pittsburg	213	0	0	0	213
	Pittsburg	0	0	200	200	200
	West Antioch	0	0	0	0	0
	East Antioch	252	0	200	200	452
	Dublin/Pleasanton	0	0	0	0	0
	West Livermore	0	0	200	200	200
	Hercules	0	0	0	0	0
TOTAL: EXPRESS BUS PARK/RIDE		**1,003**	**0**	**600**	**600**	**1,603**
GRAND TOTAL: RAIL STATIONS AND EXPRESS BUS		**27,292**	**387**	**7,845**	**8,232**	**35,524**

(a) A 25¢ parking charge is in effect at Lake Merritt Station. All other BART-owned parking is free.

(b) The FY 1988/89 objective to provide 499 new parking spaces is based on the addition of 252 spaces at North Berkeley station by June 1989. As part of the first phase of this project, 112 of these spaces were opened for use in June 1988.

(c) These free spaces at Lafayette and Orinda Stations are subject to special parking controls.

Transit Authority's (CCCTA) bus routes which provide access to five Concord-line stations. This restructuring has cut waiting times and for longer trips, door-to-door travel times. These incentives stimulate ridership for BART as well as for the connecting bus service. BART and AC Transit are seeking funding for capital projects at various BART stations to accommodate AC's route restructuring and to improve the comfort and safety of riders. Similar efforts are underway with CCCTA.

In advance of bus route restructuring, a six-month demonstration project for Hayward Station was implemented in May 1988 for the purpose of testing the effect on ridership of timed transfers between buses and BART trains. This joint demonstration project involves the coordination of up to 15 AC bus routes, one San Mateo County Transit (SAMTRANS) bus route and one BART express bus route. all of which serve Hayward Station.

Complementing the route and schedule improvements, is the AC/BART Plus Ticket, a single ticket which is currently available and permits unlimited AC Transit riding in combination with a stored BART fare. (This semi-monthly ticket is available in varying denominations depending upon travel distance.) **BART will also introduce in FY 1988/89 a combined ticket for use on BART express buses and trains.** This along with **express bus route modifications** to cut travel times where possible, completion of **express bus park-ride lots,** and special - **pricing incentives** are expected to **attract more train riders** by making BART stations more accessible. For additional travel convenience, plans are now underway to develop a universal ticket which would permit use of a single stored fare ticket on BART and other transit systems.

Another access project is the **Daly City Station Intermodal Facility** which will improve the internal circulation for buses, as well as for pedestrians and cars. Daly City Station is the fifth busiest after the four downtown San Francisco stations, and is a terminal for 20 bus routes operated by SAMTRANS and three MUNI routes.

Easier Access For The Elderly And Handicapped: The BART Task Force on Access for Elderly and Handicapped Persons meets regularly with BART staff for the purpose of identifying projects which may improve BART accessibility. The Task Force is currently preparing a multi-year master plan and annual work program which address the accessibility needs of mobility-, vision-, hearing-impaired and developmentally disabled customers. Once the plan and work program are completed, the Task Force will work with staff to incorporate specific elements into BART's project review process and implement those elements which are mutually acceptable.

An improvement that BART developed in consultation with the Task Force was the **elevator modification program.** When this program is completed, station elevators will be equipped with intercoms, closed circuit monitors, new self-operation call buttons which will be lower for easy reach by customers in wheelchairs, and elevator call-card readers.

*** Human Resources ***

How BART employees feel about their work directly impacts their productivity (the subject of Chapter Three) and the quality of BART service. This, in turn, affects both demand and BART's overall financial outlook. As part of its strategy to stimulate demand, BART is placing additional emphasis on customer relations Efforts will focus on improving the way in which business is conducted at all levels in support of a **new goal added this year: Develop and maintain a BART workforce that is motivated to provide the best service possible to BART passengers.** For new as well as existing riders, BART needs to improve the "user friendliness" of its trains, its stations, and its people.

*** Marketing ***

Service and improvements will be marketed aggressively with specific programs and strategies outlined in a separate marketing plan. The marketing plan will be designed to support BART's short- and long-term objectives, with research findings serving as the foundation for strategies employed. A portion of BART's potential market is expected to be very responsive to the new service. Infrequent BART riders will ride more often. Word will get around to others that there are more and longer trains in service, bus connections are better, and there's more parking.

Other market segments, consisting of people who could use BART but don't, may be more difficult to capture. Reasons for this are linked to awareness and habit. The primary focus of BART's marketing program is this less-responsive group of potential customers. These are people with limited or outdated knowledge about BART, or with firmly established travel habits.

The strategy for stimulating all segments of BART's potential market is based on information and incentives. Information means knowledge on which to base a decision. Incentives mean motivation to act on that decision. This translates to more people first thinking about BART as a way of satisfying some of their mobility needs, followed by decisions to actually use it.

Information: Marketing activities will focus on disseminating information about BART in a variety of ways, including use of direct mail **print and broadcast media.** Marketing activities will also focus on making specific kinds of information available to customers to assist them in their travel plans and use of the system. This is particularly important for infrequent or first-time customers, who may have limited or no knowledge of how or where to buy tickets, train routes and schedules, and key destinations the system serves. To meet this need, BART will continue to make available **special brochures** which provide information about these and other aspects of the system. Advance notice about **special train service** to major events will also be made available as part of marketing BART for non-work trips.

Additionally, BART will be expanding the **Information Centers Project** to all stations which have been designated as regional transfer stations. This Regional Transit Association sponsored project (the RTA is a special joint-powers agency consisting of seven Bay Area transit operators) consists of information display cases showing local bus routes, schedules, and points of interest near BART stations. BART will also be **improving signing** and providing **train schedule information** on the platform level of stations.

Incentives: BART will aggressively market service to major Bay Area events served by the system. Demand for an event, such as the annual Bay-to-Breakers footrace in San Francisco, may warrant **special service** during a time period when trains normally don't operate (i.e., before 9 a.m. on Sundays) or **extra service** during regular hours. BART will be studying the impact of providing **more frequent service** at night and on Sunday, when trains run 20 minutes apart on two of the system's four routes, as an incentive for increased ridership. Based on the outcome of this study, additional service may be provided.

Incentives which encourage greater system use will also be provided by a **variety of pricing mechanisms**, most of which are currently in effect. These include **discount travel** (currently at 90%) for children between the ages of 5 and 12 years of age (children under 5 can ride free), persons 65 years of age and over and anyone having a mobility impairment which qualifies under the Regional Transit Discount Program. Regular adult fare discounts will continue to be provided by the sale of reduced-priced high value tickets. Currently, $32 tickets are available for $30.

BART will be stepping up efforts to **increase the number of offsite ticket sales outlets**, the only places where discount tickets are sold. Just over half of BART's offsite ticket outlets are banks and retail stores. The target is to increase these outlets **from 126 now to 150 by June 1989.** Other offsite ticket outlets generally do not sell discount BART tickets to walk-in customers, but are for the convenience of a specific clientele. These include employers, schools, senior centers, and disabled centers. Employers constitute the majority of these outlets, which currently number 80 out of a total of 100. The marketing of transit with regard to employer participation falls largely under the direction of the RTA. BART, however, will be aggressively working to increase the number of participating employers in this program further.

An additional incentive will be **AC Transit's restructuring of its bus routes** which will make both BART and AC more accessible to more people. Activities will focus on increasing the public's awareness of these improvements along with **marketing the service** in the form of a single bus/rail ticket, like the current AC/BART Plus Ticket. Similar activities are planned for BART express bus service.

*** Joint Development ***

Joint development at stations represents good land-use planning by concentrating development where people have an alternative to the automobile. As such, BART's joint development program has significant long-range implications for ridership. Multiple-use developments in the vicinity of rail stations **create new markets for BART service**, markets which would otherwise not exist. In support of stimulating ridership and creating these new markets, BART will be continuing its efforts to market selected station sites for development.

During FY 1988/89, BART expects to **sign a minimum of one ground lease.** Additionally, **station area plans for Rockridge, Hayward, El Cerrito del Norte, and Bay Fair** are slated for completion by June 1989. These plans will provide direction for future joint development activities at these stations.

*** Concessions and Property Management ***

BART's **concessions program** focuses on the leasing of space at stations. This program, too, has the potential for increasing ridership by making the system more attractive in terms of the services housed within stations. BART is currently negotiating with a major firm for the opening of newspaper, gifts, and sundries shops at eight high volume stations. Other efforts are focusing on establishing Federal Express drop facilities at 32 stations. Additionally, several financial institutions have expressed interest in setting up an ATM network in stations, which would be capable of dispensing both cash and BART tickets in conjunction with the use of credit or debit cards.

Efforts to realize these and other enhancements to stations will be carried forth in the current planning timeframe. **The potential ridership gains expected to occur from both the joint development and concessions programs are substantial**, as are their impacts on revenue generation, a subject discussed in Chapter Three.

Extensions

BART was conceived and grew out of a need for a regional rail system linking population centers which are separated by land and water barriers. The events which led to the current three-county District have helped shape BART's policy on extensions. Briefly, this policy places a first priority on fulfilling BART's obligation to Alameda, Contra Costa, and San Francisco counties, BART's member counties. The details of BART's extension policy along with the issues and future outlook are the subjects covered in Chapter Two: BART Service Delivery. The discussion here follows Chapter One's theme which focuses on the market for BART service.

Extending BART means reaching into new markets; each extension tapping a unique reservoir with its own potential for generating BART trips. The ridership implications of an extension depend largely on population and employment patterns, and how well the existing transportation network is handling the demand. The following summarizes each proposed BART extension, the areas served, and the level of ridership projected based on the most recent adopted studies. (Patronage forecast dates do not imply extension service start dates.)

Pittsburg-Antioch: Pressures in the more densely developed central part of the Bay Area have resulted in substantial population increases in this corridor, and the need for long-distance commuting. The corridor is traversed by the SR-4 freeway and is served by a relatively low level of local transit. Additionally, BART express buses provide service to Concord Station at about half the frequency of Concord-line trains for any given service period. The proposed **5-station** extension is **16.0 miles** long and has been forecast to generate **13,450 weekday trips** at full operation.

Livermore-Pleasanton: Development pressures and resulting travel patterns are similar to Pittsburg-Antioch. Higher future employment projected for this corridor, however, is expected to result in greater reverse-commute travel demand. Current local transit service is also at a relatively low level. BART express buses link the Livermore Valley with BART at Bay Fair and Hayward stations to the west, and Walnut Creek Station to the north. The **first phase** extension is a **12.8 mile** line from Bay Fair Station to Dublin, most of which is in the median of I-580, the Valley's main highway link to the more densely populated communities to the west. Ridership estimates for this **2-station** extension project **24,400 weekday trips** in the year 2005. **Under phase II**, extending the line **11.4 more miles** to Livermore with **3 additional stations** is projected to generate **5,700 weekday trips**; for a total of **30,100 trips for the entire 5-station/24.2 mile line.**

West Contra Costa County: Lying between Richmond and the Carquinez Bridge and traversed by I-80, this corridor has experienced rapid growth in the past decade. Travel demand is compounded by similar development to the northeast, all along I-80 between Vallejo and Sacramento. Caltrans will be reconstructing reconstructing I-80 over the next several years. The proposed **7.6 mile** BART line is a **4-station extension** of the Richmond line. Ridership is projected to be between **10,000 and 15,000 weekday trips** at full operation.

Fremont-South Bay: The area between Fremont and San Jose has experienced rapid growth in population and jobs, a sizable portion of which are related to the computer industry. The primary arteries traversing the corridor are I-680 and I-880. This latter freeway, also known as the Nimitz, is one of the Bay Area's most congested highways, and is just now starting to undergo a six-year reconstruction program. A **5.4 mile extension** from Fremont Station to the Warm Springs district of Fremont near the Alameda-Santa Clara county line would add **2 stations** and is projected to generate **12,000 to 15,000 weekday trips** by the year 2000. Continuing the extension into Santa Clara county, **15.1 additional miles** to downtown San Jose, would add another **7 stations** and generate about **23,000 more riders** each weekday. The **entire 20.5 mile, 9 station extension** from Fremont to San Jose would **add about 35,000 to 38,000 new BART trips** each weekday by the year 2000.

Peninsula-West Bay: Lying in San Mateo and Santa Clara counties, this is a well-defined narrow travel corridor traversed by I-280 and US-101. These are heavily used and parallel freeways which are generally within five miles of one another. San Mateo County constitutes the northern two-thirds of the corridor. This county is densely developed, and has experienced a relatively high rate of employment growth. It is in this part of the Peninsula Corridor that the Bay Area's principal airport, San Francisco International, is located. The southern third of the corridor, in Santa Clara County, has had extremely high growth in population and employment, which has been catapulted by the emergence of Silicon Valley. The corridor has a long history of rail transit and is today served by 26 weekday Caltrain departures in each direction between San Francisco and San Jose. Ridership for this service is just under 16,000 weekday trips. A **7.1 mile BART extension** to the vicinity of San Francisco Airport would **add 4 stations** and is projected to generate about **50,000 weekday trips** in the year 2000. The full **42.0 mile extension** to San Jose would **add 20 stations** south of Daly City and would generate on the order of **117,000 weekday trips** in the year 2000.

CHAPTER TWO:

BART SERVICE DELIVERY

- BART Service. . .From Design To Delivery
- Setting And Achieving Service Standards
- Delivering Better And More Service

CHAPTER TWO REFERENCE GUIDE

BART SERVICE DELIVERY

HIGHLIGHTS

- BART's challenge for service delivery is to expand capacity without compromising service reliability.
- The strategy for delivering quality service is based on adherence to stringent preventative maintenance and performance standards.
- Key programs which assist BART in meeting its service delivery objectives are the Load Factor Monitoring Program and Delay Monitoring Program.
- More reliable vehicle, wayside, and central train computer components, along with effective management of service delays, will enable BART to make full use of the Capacity Expansion Program.
- The system's maximum service frequency will be increased 53%, from the current 17 trains per hour in one direction to 26 per hour by December 1990. Supporting this will be a 35% increase in the number of cars in service, forming 22% more trains relative to today.
- Other important aspects of service BART will continue to focus on include: assuring availability of escalators, elevators, and vital station equipment; maintaining a safe and secure operating environment; providing quality express bus service; expanding parking and improving coordination with feeder transit; and working toward realizing system extensions.

PERFORMANCE INDICATORS

- Car availability
- Service delays
- Car throughput (Key)
- Load factors
- Patron ontime (Key)
- Patron accident rate
- AFC incident rate (Key)
- Elevator availability
- Escalator availability
- Express bus ontime

REFERENCE DOCUMENTS

- BART Composite Report, P.B.T.&B. (1961)
- BART Maintenance Program (1988)
- BART Quarterly Operations Performance Report
- 1987 Bay Area Council Survey
- Caltrans TIP (1987)

Progress for BART means **delivering quality transit service.** This requires the continuation of effective programs which guide efforts for system operations, maintenance, and expansion. BART ridership has been shown to be sensitive to both service quality and quantity. Accordingly, BART's top priority is to continue to achieve high performance standards. Following from this, BART's challenge is the timely implementation of essential programs and capital improvements which will allow for more and better service to be provided. This includes the near-term challenge to complete the Capacity Expansion Program and phase in higher frequency service without compromising safety or reliability, and improving system access by providing more parking and better coordination for connecting transit. Longer-term challenges for BART lie primarily in the areas of joint development and extensions, with interim progress marked by the achievement of key milestones for each of these programs.

BART SERVICE. . .FROM DESIGN TO DELIVERY

From the mid-1940s to the mid-1950s, urban travel patterns and habits changed dramatically. Automobile travel eroded transit use and opened new markets not served by transit. Highway use and capacity grew rapidly to the point that additional highway expansion seemed undesirable. Transit's key supporting role began to emerge, but the travel market had become much more competitive.

To attract riders to transit, **BART's designers sought to emulate the performance and comfort of the automobile.** This included the provision of wide and plush seating, climate-controlled and well-lighted interiors, and high speeds. Improved suspension, propulsion, and control systems represented a new level of transit performance. In practice, however, the promise offered by the newly designed system took a bit longer to be realized.

Train control and car component problems plagued BART for much of the 1970s. During this time, BART developed a comprehensive program of performance monitoring, with particular emphases on service reliability and capacity. Events in the 1970s also ushered in an effort which is known today as BART's Capacity Expansion Program. Additionally, BART's focus on service quality gave rise to three key indicators for tracking important aspects of system performance as perceived by customers. These are peak period transbay **car throughput, patron ontime** performance, and automatic fare collection **(AFC) equipment incident rate.** The first indicator measures the delivery of scheduled capacity. The second measures the delivery of customers versus the published train timetable. The third measures performance of vital station equipment.

By the end of the 1970s, BART's train operations had improved significantly because of three key programs. BART's **Reliability Improvement Program** produced vehicle modifications which greatly improved car performance. Also, a backup train protection system, which was sought by the California Public Utilities Commission (CPUC), provided the assurance of operating safely at greater frequency. Further, **conversion of 35 excess A-cars to B-cars** greatly improved fleet utilization and available capacity. These improvements made possible the expansion of BART service in July 1980. Direct service started between Richmond and San Francisco; minimum headways were reduced from 6 minutes to 3 minutes, 45 seconds. This resulted in a 60% increase in service with 16 trains able to cross the Bay in the primary demand direction in the peak hour. More recently, completion of the **Vehicle Fire Hardening Program** in August 1986 made possible the addition of two more trains to peak period transbay service, with 17 in the peak hour. This brought the maximum number of trains on line during rush periods to 45.

SETTING AND ACHIEVING SERVICE STANDARDS

Evolution of BART service and the annual policy review process have increasingly focused on service delivery issues. The first three goals (shown in Figure 2) established the context for BART rail service. Experience to date, as well as District market research, indicates that BART **passengers place a high value on consistently reliable service.** BART's three key performance indicators reflect this concern.

*** Production of Service ***

The delivery of scheduled capacity depends on two factors. First, cars must be maintained to high standards and made available to form trains. Second, once placed in service, trains must perform as scheduled, delivering the capacity to meet customer demands. This is especially critical during peak travel periods, when virtually all of BART's available cars are pressed into service.

This emphasis has resulted in the emergence of **peak period transbay car throughput** as one of BART's key performance indicators for service delivery. Car throughput is expressed as a percent and measures the number of cars making the transbay crossing in the primary demand direction during the peak period versus those scheduled. This, in essence, is one of the "bottom line" service delivery indicators which **reflects overall performance for both maintenance and operations.** Achievement of favorable performance with respect to **car availability** and **service delays** supports efforts to deliver adequate capacity. This, in turn, is reflected by customer crowding on trains as measured by **load factors.**

Figure 11 presents actual peak period transbay car throughput for the past five years by quarter. As shown, performance has been consistently above 96% except for the first three quarters of FY 1985/86, when construction for the KE Track and Daly City Turnback had an impact on mainline operations. With completion of work on these projects, car throughput returned to more favorable levels which, for the most part, lie between 97.0% and 97.5%. **BART's objective** for this key indicator is to achieve **97.5% peak period transbay car throughput in FY 1988/89 and during the four following years, as capacity and service frequencies are increased.**

*** Delivery of Service ***

Automated faregate and train history information systems enable BART to measure the percentage of riders delivered on time to their destination station relative to scheduled train run times. **Patron ontime performance** is another key indicator for service delivery, one which reflects overall train performance and the proportion of customers affected by service delays.

Figure 12 presents levels achieved for patron ontime performance for the past five years by quarter. As with car throughput, construction for the KE Track and Daly City Turnback had an unfavorable impact on patron ontime performance in FY 1985/86. Before mid-1985, patron ontime averaged between 92% and 94%.

Figure 11

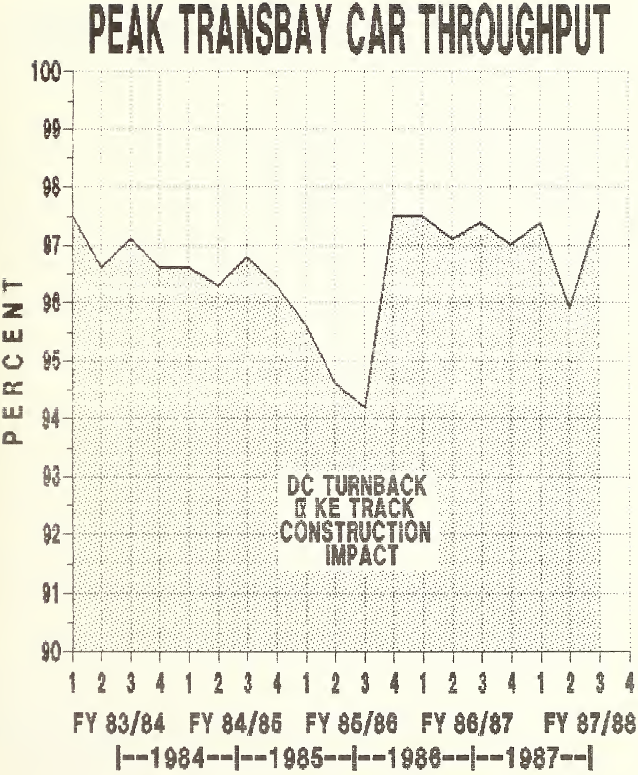
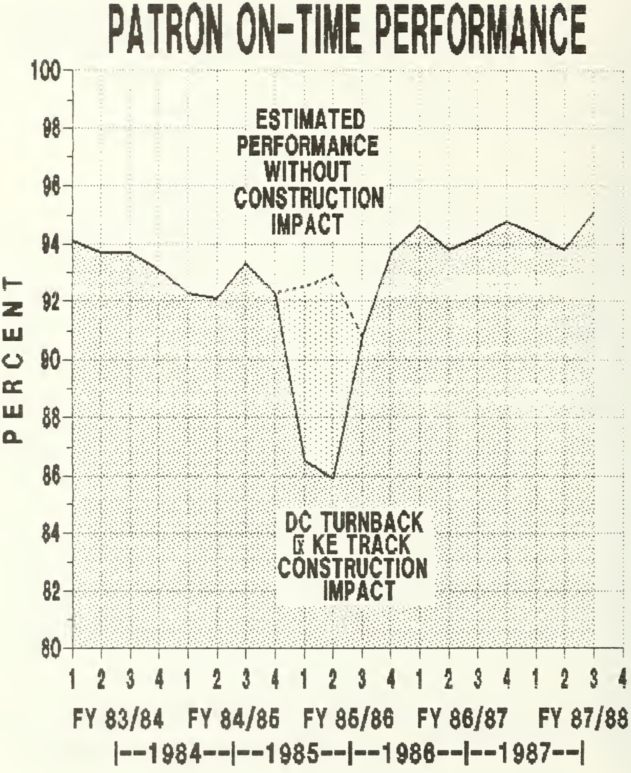

PEAK TRANSBAY CAR THROUGHPUT
PERCENT
100
99
98
97
96
95
94
93
92
91
90
DC TURNBACK
& KE TRACK
CONSTRUCTION
IMPACT
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 83/84 FY 84/85 FY 85/86 FY 86/87 FY 87/88
|--1984--|--1985--|--1986--|--1987--|

Figure 12


PATRON ON-TIME PERFORMANCE
PERCENT
100
98
96
94
92
90
88
86
84
82
80
ESTIMATED PERFORMANCE WITHOUT CONSTRUCTION IMPACT
DC TURNBACK & KE TRACK CONSTRUCTION IMPACT
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 83/84
FY 84/85
FY 85/86
FY 86/87
FY 87/88
|--1984--|--1985--|--1986--|--1987--|

During the construction period, performance dipped to about 86%, reflecting mainline service interruptions and slower train speeds. After work was completed for the KE and Turnback, patron ontime performance rebounded and has held between 94% and 95%. This compares favorably to BART's **94% patron ontime performance objective** which has been retained for the current five-year period.

*** Vital Station Equipment ***

Ticket, faregate, and other AFC equipment must perform to high standards in order to maintain unimpeded customer flows entering and exiting stations. BART's third and last key performance indicator for service delivery focuses on this. The **AFC incident rate** reflects the proportion of customers affected by equipment problems which cannot be corrected by station agents.

BART's objective since FY 1982/83 has been to **maintain an AFC rate of 0.30 incidents per 1,000 trips.** This standard has been retained for the current five year period. Actual performance for the past five years by quarter is presented in Figure 13. The 0.30 standard has been achieved for eight of the quarters shown. Defective ticket stock and modifications made to faregates to accept multi-operator passes have resulted in unfavorable performance, mainly in FY 1985/86. AFC performance was affected by malfunctioning replacement parts in FY 1987/88. Early identification of the problem and corrective action reversed the unfavorable increase for the AFC incident rate. By the end of FY 1987/88, BART reduced this rate to 0.27 incidents per 1,000 passenger trips.

DELIVERING BETTER AND MORE SERVICE

Service delivery improvements depend upon the timely implementation of programs and capital projects. A cornerstone for this effort is BART's Capacity Expansion Program. According to the Bay Area Council's annual survey, **transportation is the most frequently cited regional problem.** Highway congestion is worsening. Growth of new downtown-oriented peak period travel is likely, given current and projected office expansion plans in San Francisco and Oakland. Significant expansion of highway capacity, especially during the next few years in the transbay and other key corridors, is not likely to occur. Programmed highway reconstruction for I-80, I-680, and I-880 is expected to result in increased traffic congestion and a shift to BART usage, as these long-term highway improvements will require lane closures over the next several years. The BART Capacity Expansion Program is designed to address this need, especially in the transbay corridor.

For the Capacity Expansion Program to be fully effective, however, will require the partial implementation of BART's **Capital Improvement Program.** Many of the projects contained in this program (see Figure 14) are in direct support of achieving high performance standards and realizing projections for ridership and revenue. This program is a key to capacity expansion, improved access, extensions, and maintaining and improving all other functional aspects of the 71-mile basic system. Details of how BART will increase service, and the projects needed for this to occur, are presented in the following sections by program area. Keeping within this chapter's focus, the discussion is presented mainly within the context of the first program area, capacity and reliability. Additional information for capital projects is contained in BART's 1988 Five Year **Capital Improvement Program,** which is under separate cover.

Figure 13

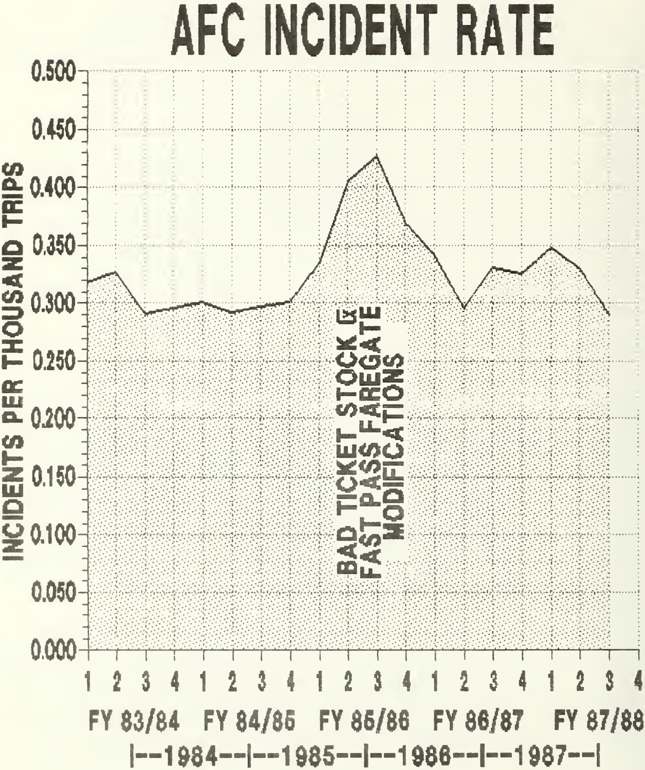

AFC INCIDENT RATE
INCIDENTS PER THOUSAND TRIPS
0.500
0.450
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
BAD TICKET STOCK &
FAST PASS FAREGATE
MODIFICATIONS
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 83/84 FY 84/85 FY 85/86 FY 86/87 FY 87/88
|--1984--|--1985--|--1986--|--1987--|

Figure 14

1988 CAPITAL IMPROVEMENT PROGRAM, PROJECT SUMMARY

BASIC SYSTEM PROJECTS		FMS NO.
1.	Train Operator Break Room Modifications, 3 Yards	(01RM) (03PM) (05NF)
2.	Consolidate Component Repair Shop	(01SO)
3.	Canopy Storage Shed, Hayward Yard	(01ST)
4.	Replace West Entrance Gates, Richmond Station	(05LB)
5.	Replace PCB Transformers, San Fransico Vent	(09FE)
6.	Emergency and Patron Stairways, Embarcadero Station	(11FG)
7.	Fire Department Connections, 21 Stations	(15AZ)
8.	Rail Replacement	(15CL) (15CM)
9.	Escalator Rehabilitation	(15LC)
10.	Underground Storage Tank Monitor	(15SA)
11.	Eliminate Station Interfaces	(20AC)
12.	Station Backup Power	(20HB)
13.	Yard Efficiency Modifications, ACI System Improvements	(21EB)
14.	Automatic Protection and Battery Backup	(27BC)
15.	RADCOM	(270C)
16.	Coupler Pins and Solenoid Valves	(41EM)
17.	Multi-Denominational Bill Validators	(45AN)
18.	IBM Ticket Transport Retrofit	(45BF)
19.	IBM Faregate Fans, AC/BART Plus Ticket	(45BN)
20.	Cubic Faregate Mods, AC/BART Plus Ticket	(45CK)
21.	9 Ticket Vendors and 8 Addfare Machines	(47BA)
22.	Platform Train Schedule Signs	(59CK)
23.	Station Platform Signing Mods, MacArthur Station	(59CM)
24.	RTA Information Centers, Areawide	(59DD)
25.	4 Tractor Trailer Armored Trucks	(68DE)
26.	Replacement Maintenance Equipment, Miscellaneous	(79--)
27.	Replacement Overage Sedans/Maintenance Vehicles, Misc.	(79B-)
28.	New Vans and Pickup Trucks	(79AC) (79AD)
29.	New High-Rail Vehicles	(79DA)
30.	Vacuums and Scrubbers	(79IV)
31.	Portable Radios, Train Operators	(79LC)
32.	Rail Grinder	(79MP)
33.	Inventory Buildup	(93DP)
34.	C-Car Startup	(99*73)
35.	System Performance Study Justified Projects	(99*75)
36.	Daly City Turnback Reserve Over-run	(99*77)
37.	System Performance Study, Phase II	(99*80)
38.	System Safety Upgrade, Phase III	(99*15)
39.	Land and Land Rights	(99*50)
40.	Agency and Utility Agreements	(99*51)
41.	Other Costs; Insurance, Bond Agents, etc.	(99*52)
42.	Outstanding Claims	(99*54)
43.	Project Development	(99*55)
44.	Planning and Joint Development	(99*56)
45.	Joint Development Infrastructure Improvements	(99*59)
46.	Improvement Allowance	(99*66)
47.	Entrance Canopies	(99*84)

CAPACITY EXPANSION PROJECTS		FMS NO.
1.	Daly City Turnback and Yard	(11--)
2.	Daly City Initial Shop Facilities	(11TD)
3.	Electrical Capacity Improvements	(15EG)
4.	Wayside Train Control and System Performance Mods	(20--)
5.	Second Generation ATO, 136, A-Car Sets	(41GB)
6.	C-Car Procurement Specifications	(42AA)
7.	Integrated Control System, ICS	(61--)

ACCESS IMPROVEMENT PROJECTS		
1.	Parking Facility, 435 Spaces at Lake Merritt Station	(01EE)
2.	Park/Ride Facility, 100 Spaces in Alameda	(01GG)
3.	Parking Facility, 859 Spaces at Fruitvale Station	(01GH)
4.	Parking Facility, 844 Spaces at Bay Fair Station	(01MH)
5.	Parking Expansion, 296 Spaces on Atherton Site at Hayward Station	(010F)
6.	Parking Structure, 950 Spaces at Hayward Station	(010G)
7.	Satellite Parking, 500 Spaces for Union City Station	(01VG)
8.	Parking Facility, 500 Second Deck Spaces at Rockridge Station	(03EB)
9.	Parking Facility, 500 Spaces at Orinda Station	(03HG)
10.	Parking Facility, 700 Spaces at Lafayette Station	(03JG)
11.	Parking Facility, 1,132 Spaces at Walnut Creek Station	(03LG)
12.	Parking Facility, 1,200 Spaces (Expansion) at Pleasant Hill St.	(03NE)
13.	Parking Facility, 1,200 Spaces (Replacement) at Pleasant Hill St.	(03NG)
14.	Additional Platform Stairway, Concord Station	(03RB)
15.	Parking Facility, 900 Spaces (Phase II) at Concord Station	(03SH)
16.	Parking Facility, 1,385 Spaces (Phase I) at Concord Station	(03SN)
17.	Park/Ride Facility, 100 Spaces in Brentwood	(04RA)
18.	Parking Facility, Virginia Street in North Berkeley	(05GB)
19.	Parking Facility, 1,200 Spaces (Phase II) at El Cerrito del Norte	(05KH)
20.	Parking Facility, 1,200 Spaces (Phase I) at El Cerrito del Norte	(05KI)
21.	Parking Lot Completion, West End at Richmond Station	(05MD)
22.	Parking Facility, 912 Spaces at MacArthur Station	(07GH)
23.	Parking Facility, 900 Spaces at West Oakland Station	(11EG)
24.	Replacement Parking, 270 Spaces at West Oakland Station	(11EH)
25.	Daly City Intermodal Facility, Preliminary Engineering	(11UB)
26.	Self-Operating Elevator Improvements, E & H Mods	(15NG)
27.	Parking Productivity Improvements, 1,942 Spaces	(0--&)

EXTENSION PROJECTS		
1.	Fremont-South Bay Study	(02AC)
2.	Pittsburg-Antioch Phase I, EIR and Preliminary Engineering	(04AC)
3.	Highway 4 Willow Pass Grade Mods	(04CB)
4.	Park/Ride Lot, 200 Spaces at Railroad Avenue	(04IA)
5.	Park/Ride Lot, 200 Spaces at Somersville Road	(04KA)
6.	Park/Ride Lot, 200 Spaces (Phase I) at Hercules	(06KA)
7.	Livermore-Pleasanton, Planning	(08AB)
8.	Bus Transfer and Park/Ride Lot, West Livermore	(08KA)
9.	Right-of-Way Acquisition	(0-B-)
10.	Irvington, Warm Springs Extension	(02--)
11.	North Concord, Pittsburg- Antioch Extension	(04--)
12.	Castro Valley, Livermore-Pleasanton Extension	(08--)
13.	San Francisco Extension Project	(99*79)

*** Capacity and Reliability ***

BART's strategy for delivering high quality service is based on adherence to stringent preventative maintenance procedures and standards. This, in concert with a comprehensive program for monitoring performance, will allow BART to continue to provide adequate capacity when and where needed. Achieving favorable performance with respect to BART's three key service delivery indicators (i.e., car throughput, patron ontime, and AFC performance) will require concentrated efforts for a number of supporting functions. This will become especially important as headways are reduced and more trains are placed in service.

Maintenance shops will need to **maintain 4 a.m. car availability of 85% for A- and C-Cars and 90% for B-cars.** This is critical for having a sufficient number of vehicles to form all scheduled trains with enough seating capacity to accommodate demand.

Once trains are dispatched, **adherence to schedule is paramount.** When delays occur, how effectively they are managed will determine the rate of service recovery. Analyses of factors which cause delays have helped BART to identify needed corrective actions and fall-back operational strategies for minimizing service interruptions. BART has consistently achieved its objectives for delay incidents and delayed trains since mid-1986. Since closer headways will require even better delay management, the delay threshold has been made more stringent, decreasing from 7 to 5 minutes. Directly in support of car throughput and patron ontime performance, BART will strive to provide service **such that no more than 3% of peak period trains experience a primary delay exceeding 5 minutes and no more than 8% experience a delay exceeding 5 minutes from any cause.**

Provision of an adequate number of cars and effective delay management will enable BART to control passenger loadings. This is measured by train load factors which are expressed as the ratio of on-board passengers to seats (see Figure 5 in Chapter One). The policy regarding **load factors** has been revised this year, from one based on balancing peak train loads (under conditions of not having additional cars) to one **based on achieving a 1.00 average** peak train load factor for those consists BART can alter (as determined by the 3-car minimum and 10-car maximum train lengths). BART's policy for offpeak service is not to exceed a 1.00 load factor on average. The addition of C-cars to the operating fleet will permit scheduling longer trains beginning in mid-1988. This will lower load factors somewhat for those trains which are not already at their 10-car maximum. Load factors are not expected to be reduced significantly, however, until additional trains can be placed in service starting in April 1989. The plan for accomplishing this and supporting analysis are as follows.

The goal of BART's Capacity Expansion Program is to reduce minimum allowable headways, thereby permitting more trains to be placed in service. Projects required to achieve or support each successive headway reduction are identified in Figure 15 together with their respective completion dates. **The target dates shown reflect the status for project implementation and new service start up as of March 1988, which correspond to the ridership and financial projections. These target dates may be altered by changes in project completion schedules.**

BART's strategy for implementing the new service reflects lessons learned from previous service increments. New service will be introduced in increments to

FIGURE 15

BART CAPACITY EXPANSION PROGRAM
STATUS AS OF MARCH 1988
Target Dates May Be Altered By Changes In Project Completion Schedules

Minimum Headway Capability (Min:Sec)	Projects Required To Achieve or Support This Headway	Anticipated Project Completion Dates	Target Expanded Service Start Dates	Peak Hour Trains Peak Direction Transbay	Peak Period Capacity Trains		On-Line Cars	Spare Cars	Total Cars Required	Available Fleet A/C-Cars @85% B-Cars @90% (Extra)	Operating Fleet Size	
3:45 (except for 3:00 during peak 15 minutes)	Current Service	---	Nov 86	17	45	A B T	90 248 338	16 24 40	106 272 378	114 (+8) 272 386 (+8)	134 303 437[a]	A B T
	Delivery of 48 C-Cars	Aug 88	Sep 88	17	45	A C B T	80 40 248 368	16 0 24 40	96 40 272 408	114 (+18) 40 272 426 (+18)	135 48 303 486	A C B T
3:10	Daly City Turnback	Nov 88	Apr 89	19	51[b]	A C B T	100 61 234 395[b]	14 6 37 57	114 67 271 452	114 81 (+1) 272 (+1) 467 (+2)	135 96 303 534	A C B T
	Delivery of 48 Additional C-cars (96 total)	Mar 89										
2:30	New On-Board ATC (A-Car Retrofit)	Jan 89										
	Daly City Yard	Apr 89										
	M-87 Interlocking	Jul 89										
	Wayside Train Control/System Performance Mods	Jul 89										
	Delivery of 54 Additional C-Cars (150 total)	Oct 89										
	Electrical Capacity Increase: - Procure/Install Substation	Jun 90	Jul 90	23[c]	52[c]	A C B T	72 114 230 416[c]	8 12 42 62	80 126 272 478	114 (+34) 128 (+2) 272 514 (+36)	135 150 303 588	A C B T
2:15	Brake Rate Algorithm Modifications	Jun 90	Dec 90	26[d]	55[d]	A C B T	91 120 230 441[d]	14 6 42 62	105 126 272 503	114 (+9) 128 (+2) 272 514 (+11)	135 150 303 588	A C B T

a. Reflects 2 A-cars in use as engineering test vehicles.

b. Reflects addition of 3 trains and 13 cars on-line during peak period; also includes 3 extra trains comprised of 18 cars and required for operation of Daly City Turnback (prior to system resignaling) which do not increase actual capacity during regular peak cycle.

c. Reflects addition of 4 trains and 45 cars on-line during peak. Requirement for 3 trains in the turnback is offset by resignaling.

d. Reflects 3 trains and requirement for 20 additional cars in December 1990 with start of 2:15 headways. By the fifth year (FY 92/93), total cars required would exceed those available by 4 vehicles.

avoid reducing existing service quality standards. For example, work on the M-87 area near Daly City Station during FY 1988/89 is expected to impact service. Steps are being taken to minimize the impact. **Service changes will be implemented carefully and programmed in advance** to anticipate and ameliorate, as much as possible, service disruptions due to the transition to higher service levels. Wherever possible, full-scale or computer-based simulations will be carried out beforehand to test and verify that changes will not degrade current service levels.

Each higher service level is characterized by the number of peak hour, peak direction transbay trains, the total number of peak period trains and cars on line, spare car requirements, and total cars required. Projected availability figures are shown for comparison purposes. As shown in Figure 15, **four service increments are planned for implementation during the five year period,** as completion of supporting capital projects permits.

Current BART service is at capacity in terms of effective peak period use of available B-cars. Although additional A-cars are available, any new trains would require taking B-cars from already scheduled consists. The C-car project will add 150 vehicles to BART's fleet, the impact of which is reflected by the fleet size as shown in Figure 16. According to current plans, all available vehicles including the C-cars will be in service as of FY 1991/92. Expansion of service capacity beyond this level will require the **acquisition of additional rolling stock.** Planned service increments reflect estimated requirements based on current demand projections. Should these requirements change prior to start-up dates, service increments will be modified accordingly. (In addition to the major projects identified in Figure 15, other important projects needed to support service delivery efforts are listed in the Capital Improvement Program.)

The peak hour demand projections updated in this plan assume that existing trains will be lengthened where possible in response to increased ridership before adding trains. There are two reasons for this. Operating additional peak hour transbay trains is not possible until headways can be reduced to 3 minutes 10 seconds in April 1989. Also, trains in the balance (or "shoulder") of the peak generally have lower load factors and the capability to accommodate more cars.

Additional trains are programmed, as headway reductions permit, when trains reach the 10-car limit and demand exceeds the load factor policy. Under this approach, most of the planned additional trains are targeted for the most heavily traveled routes. This allocation strategy has generally been the basis for previous plans. Current budget constraints support this rationale.

Allocation of additional capacity among the four routes will depend on a number of factors. Chief among these is the volume of existing and projected ridership. Current and anticipated patronage estimates for the three transbay routes are shown in Figure 8. Ridership on the fourth route, Richmond/Fremont, is well below that of the transbay routes and significant additional capacity is not expected to be required.

All of the above factors have been considered in developing the proposed allocation of future service increments among BART's four routes. Planned additional trains and cars are indicated by route in Figure 17 together with existing service. The proposed plan calls for **increasing the number of trains**

Figure 16

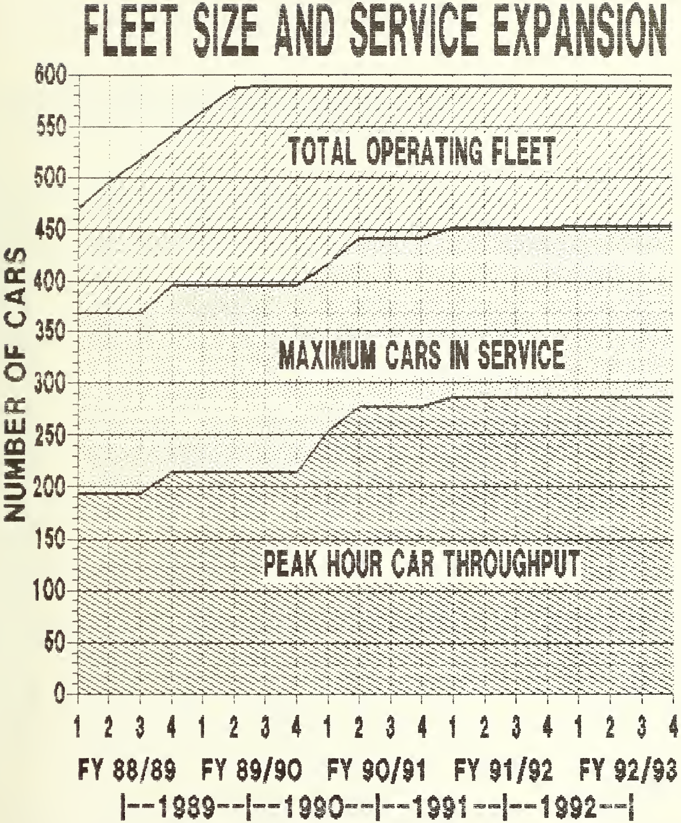

FLEET SIZE AND SERVICE EXPANSION
NUMBER OF CARS
600
550
500
450
400
350
300
250
200
150
100
50
0
TOTAL OPERATING FLEET
MAXIMUM CARS IN SERVICE
PEAK HOUR CAR THROUGHPUT
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 88/89 FY 89/90 FY 90/91 FY 91/92 FY 92/93
|--1989--|--1990--|--1991--|--1992--|

Figure 17

PROJECTED PEAK PERIOD ONLINE REQUIREMENTS: TRAINS AND CARS

	SERVICE START DATE AND MINIMUM SCHEDULED HEADWAY (Min:Sec)					
	SEP 1988 3:45	APR 1989 3:10	JUL 1990 2:30	DEC 1990 2:15	JUL 1991 2:15	JUL 1992 2:15
TRAINS ONLINE						
PEAK 60 MINUTES						
Concord/Daly City	7	8	10	11	11	11
Fremont/Daly City	6	7	8	9	9	9
Richmond/Daly City	4	4	5	6	6	6
Transbay	17	19	23	26	26	26
Fremont/Richmond	5	5	5	5	5	5
System	22	24	28	31	31	31
BALANCE OF PEAK PERIOD						
Concord/Daly City	8	9	9	9	9	9
Fremont/Daly City	5	5	5	5	5	5
Richmond/Daly City	5	5	5	5	5	5
Transbay	18	19	19	19	19	19
Fremont/Richmond	5	5	5	5	5	5
System	23	24	24	24	24	24
TOTAL PEAK PERIOD						
Concord/Daly City	15	17	19	20	20	20
Fremont/Daly City	11	12	13	14	14	14
Richmond/Daly City	9	9	10	11	11	11
Transbay	35	38	42	45	45	45
Fremont/Richmond	10	10	10	10	10	10
System	45	48	52	55	55	55
CARS ONLINE						
PEAK 60 MINUTES						
Concord/Daly City	70	80	100	109	110	110
Fremont/Daly City	60	70	80	89	90	90
Richmond/Daly City	40	40	49	54	59	59
Transbay	170	190	229	252	259	259
Fremont/Richmond	24	24	25	25	26	26
System	194	214	254	277	285	285
BALANCE OF PEAK PERIOD						
Concord/Daly City	74	77	69	70	71	71
Fremont/Daly City	41	43	38	38	39	39
Richmond/Daly City	44	46	40	41	42	42
Transbay	159	166	147	149	152	152
Fremont/Richmond	15	15	15	15	15	15
System	174	181	162	164	167	167
TOTAL PEAK PERIOD						
Concord/Daly City	144	157	169	179	181	183
Fremont/Daly City	101	113	118	127	129	131
Richmond/Daly City	88	86	88	95	101	101
Transbay	329	356	376	401	410	410
Fremont/Richmond	39	39	40	40	41	41
System	368	395	416	441	452	452
SPARE CARS	40	57	62	62	62	62
TOTAL CAR REQUIREMENT	408	452	478	503	514	514

on line from 45 now to 55 by December 1990, as shown in Figure 18. This is to be accomplished in four increments as follows (these target dates may be altered by changes in project completion schedules):

By September 1988: Availability of a portion of the C-cars will permit **lengthening of some currently scheduled trains.** The first increment involves the addition of 27 cars to the available operating fleet as of September 1988, based on the projected C-car procurement schedule. Opportunities for reducing discretionary train load factors to 1.00 exist on all four routes.

By April 1989: Minimum headways will be reduced to **3 minutes 10 seconds,** and the addition of 6 more trains will bring the total on line to 51. Three of these trains, however, reflect the need to operate one more train on each of the three transbay routes in order to maintain headways in and out of the Daly City Turnback. This results in a **net increase in capacity of 3 trains.** This headway reduction will permit the addition of two trains to transbay service in the peak hour. Based on anticipated demand, one new train is proposed for both the Concord and Fremont/Daly City routes. Additionally, maintenance of the 1.00 load factor on discretionary trains during the balance of the peak cycle is expected to require one more "shoulder-period" Concord train. Concurrent with this service increment, the spares requirement for peak service will be increased by 17 cars in recognition of longer train lengths.

By July 1990: Minimum headways will be reduced to **2 minutes 30 seconds** and one additional train will be put in service for a total of 52 on line. Completion of system resignaling will increase operating speed enough to eliminate the 3-train Daly City Turnback requirement noted above for the previous service increment. This will effectively result in a **net capacity increase of 4 trains** for this service level. Current plans are to add additional peak hour trains on each of the three transbay routes. Car requirements are expected to grow by 23 vehicles which will be allocated to all four routes, as indicated in Figure 17. An increase in the spares requirement of 5 vehicles is also planned to support this service level based on longer train lengths.

By December 1990: Minimum headways will be reduced to **2 minutes 15 seconds,** and **3 more trains added** for a total of 55 on line. The ridership forecast and load factor policy call for three additional peak hour transbay trains. With this service increase, 25 more cars will be added to peak period trains, bringing car requirements for operations to 503. This is only 11 cars less than the total available. Projected ridership growth in the final two years of the current planning period is anticipated to require all 11 of these cars plus some additional vehicles. Note in Figure 17 that, with 55 trains in service, all 514 available cars are expected to be utilized by FY 1991/92.

*** Safety ***

Safety considerations are addressed by BART's Safety Department which oversees all aspects of operations. Incidents of customer accidents are closely monitored and analyzed, and appropriate actions taken to minimize their occurrence. BART's objective for the current five year period is to **continue to provide an environment for patron circulation within stations and in trains such that the accident rate does not exceed 17.7 per million passenger trips.**

Stringent adherence to industry-accepted standards will assure that more people riding more trains is, above all, safe. Additional stairways at Embarcadero Station is one example of an improvement to safely accommodate higher passenger volumes.

Figure 18

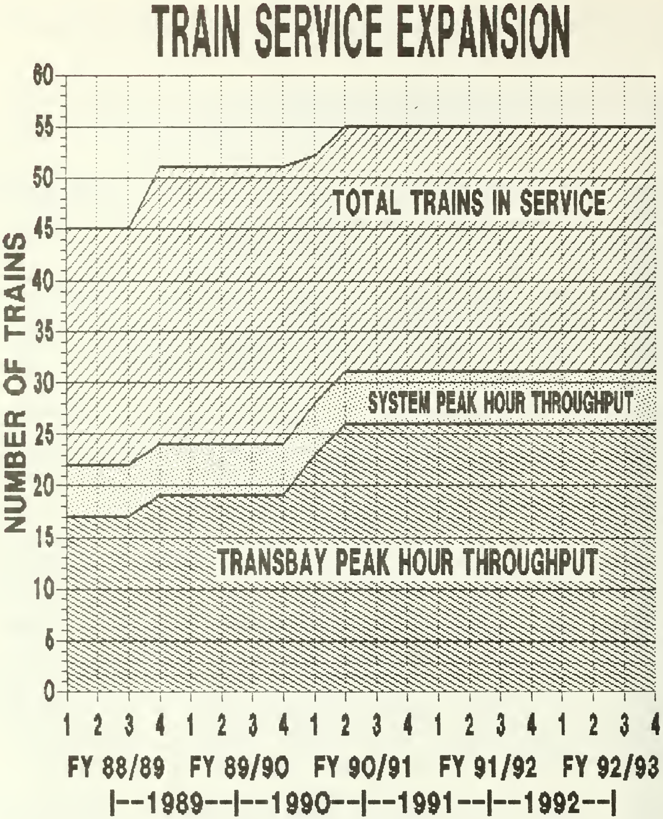
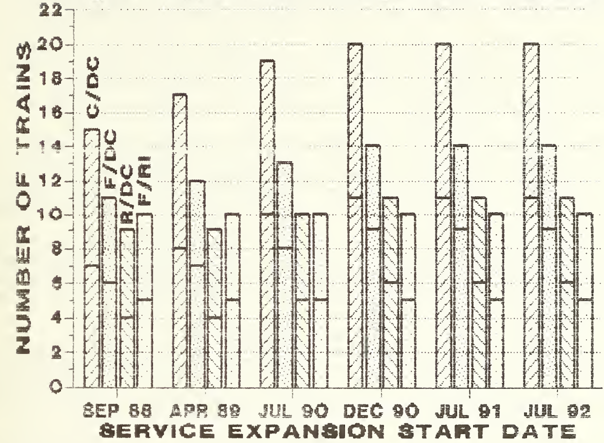

TRAIN SERVICE EXPANSION
NUMBER OF TRAINS
0
5
10
15
20
25
30
35
40
45
50
55
60
TOTAL TRAINS IN SERVICE
SYSTEM PEAK HOUR THROUGHPUT
TRANSBAY PEAK HOUR THROUGHPUT
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 88/89
FY 89/90
FY 90/91
FY 91/92
FY 92/93
|--1989--|--1990--|--1991--|--1992--|

Figure 19

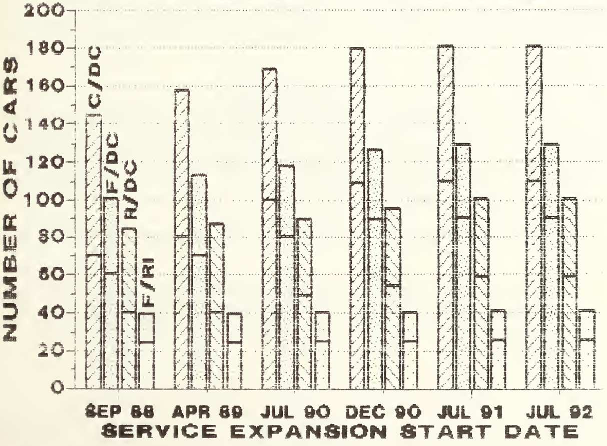
TRAIN THROUGHPUT BY ROUTE

PEAK HOUR AND TOTAL PEAK PERIOD



CAR THROUGHPUT BY ROUTE

PEAK HOUR AND TOTAL PEAK PERIOD



*** Access ***

One major thrust of BART's access program is **increasing station parking.** This is reflected by the fact that 24 out of 27 of the projects identified in the Access Improvements section of BART's 1988 Capital Improvement Program include additional parking. The strategy for supporting service expansion and accommodating increased ridership is to deliver these projects which are summarized in Figure 14. Based on the implementation schedules for these projects, programmed parking space additions are as shown in Figure 10.

Improved transit access is programmed for BART express bus operations as well as **more coordinated service** between BART and other Bay Area operators. These were discussed in the Access Section in Chapter One. Realization of these improvements will largely depend upon the availability of adequate funding and the ability of the various operators to implement their respective programs.

In support of maintaining internal accessibility and unimpeded flows within stations for increasing numbers of customers, **elevators and escalators will be maintained to achieve 96% availability.** This supports similar efforts for AFC equipment, as already discussed under Vital Station Equipment in this chapter.

*** Human Resources ***

Delivery of BART's capital program and the service it supports depends upon human resources to realize progress. BART will continue to develop its workforce for this purpose. Additional emphasis will be given to **customer service,** which will reflect how business is conducted at all levels.

*** Marketing ***

Marketing efforts will be carried out independently and in concert with the RTA. BART will **aggressively seek to stimulate demand** for peak and offpeak travel. The lead will continue to be BART's department of Public Affairs as supported by the department of Planning, Budget, and Research.

*** Joint Development ***

Progress for joint development will depend upon market conditions and BART's effectiveness to achieve interim milestones for long-term projects. The FY 1988/89 program objectives for joint development reflect this (see Figure 2 in the Introduction).

*** Extensions ***

Funding will largely determine the timing for extension projects. Details for financial requirements and other considerations for realizing system extensions are contained in BART's 1988 Capital Improvement Program. **BART will continue to develop its extensions program and advocate implementation** in accordance with the Extension Staging Policy adopted by the BART Board of Directors (see Figure 20).

Four BART Board actions which augment the policy shown in Figure 20 are as follows:

1. On February 2, 1984, the Board adopted Resolution No. 3095 supporting the establishment of an Oakland airport connector before or at the same time that an extension of BART is built to the San Francisco airport.

Figure 20

BART EXTENSION STAGING POLICY

(The several segments shown under each Roman numeral are understood to be implemented concurrently, to the extent that funding is available.)

(BART will be the operator for any new heavy or light rail transit starts or extensions within the three BART counties except for those projects developed by existing rail transit operators.)

INSIDE CURRENT DISTRICT	OUTSIDE CURRENT DISTRICT (Subject to a satisfactory cost-sharing arrangement and parallel construction within the District.) ***
I. North Concord/West Pittsburg Irvington/Warm Springs Castro Valley/Dublin MUNI Metro Extension Project*	I. Colma/Tanforan/San Francisco Airport Milpitas
II. Pittsburg/West Antioch/East Antioch Pleasanton/West Livermore/East Livermore San Francisco ** San Pablo/Hilltop Oakland Airport Connector	II. Millbrae - Menlo Park Milpitas - San Jose
III. San Francisco ** Pinole/Hercules San Ramon Corridor	III. San Jose - Menlo Park

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* The San Francisco Project is identified through coordination with the City and County of San Francisco as the MUNI Metro Extension to the CALTRAIN Depot South of Market.

** Specific San Francisco Project to be identified through coordination with the City and County of San Francisco. Section 29034.5 of the California Public Utilities Code Lists an extension of District services and facilities to the northwest section of the City and County of San Francisco as a District service commitment.

*** Pursuant to Section 29034.5 of the California Public Utilities Code, only non-District funds may be spent by the District for the purpose of extending services and facilities outside of District's January 1, 1971 boundaries until the District meets specified service commitments within the 1971 boundaries.

Board adopted September 1, 1983; Board amended February 2, 1984;
Board amended October 23, 1986; Board amended May 14, 1987.

2. On April 10, 1986, the Board, for preliminary planning purposes, adopted a preferred route alignment for the complete Livermore/Pleasanton Extension as a five station extension with possible additional mileage and a station near the major research laboratories east of Vasco Road.

3. On February 25, 1988, the Board adopted Resolution No. 4241 expanding the Extension Staging Policy to include logical terminal stations in each extension corridor.

4. In May 1988, BART and SAMTRANS executed Principles of Agreement concerning a four station extension in the San Mateo corridor.

CHAPTER THREE:

PRODUCTIVITY AND EFFICIENCY

- People Make The Difference
- Putting Knowledge To Work
- Acting On Opportunities

CHAPTER THREE REFERENCE GUIDE

PRODUCTIVITY AND EFFICIENCY

HIGHLIGHTS

- Improving productivity is contingent upon keeping operating costs in line relative to revenue growth from passenger fares and other sources.
- BART's strategy for promoting productivity and efficiency emphasizes developing human and technological resources in all of its departments, and providing a work environment which perpetuates the desire to provide the best service possible.
- One important strategy for improving BART productivity and efficiency is the stringent adherence to its preventative maintenance program which assures that equipment is in good working order and available for service.
- BART will expand its work force by 7% in the next five years; 165 new positions are needed to maintain 35% more cars, operate 22% more trains, and provide service at a frequency 53% higher than today.
- BART's Load Factor Monitoring Program is an important part of the strategy to provide adequate capacity and achieve its load factor objectives, while minimizing unnecessary car miles and related expenses.
- Additional productivity gains are partly contingent upon innovative scheduling of cars and BART's acceptance of average train load factors above the current 1.00 policy to reduce car miles and related costs.
- BART's joint development, concessions, and property management programs will seek to increase the productivity of stations and adjacent properties in terms of realizing a greater share of their revenue generating potential.
- Efforts will also be directed to stimulating income from leases and concessions by providing an opportunity for BART-compatible businesses to locate in stations.

PERFORMANCE INDICATORS

- Rail farebox ratio (Key)
- Express bus farebox ratio
- System farebox ratio
- System operating ratio (Key)
- Rail cost per passenger mile (Key)
- System utilization
- Car miles per equivalent employee
- Industrial injury rate
- Employee sick leave rate
- MBE/DBE participation

REFERENCE DOCUMENTS

- MTC Regional Transit Productivity Improvement Program (1987)
- BART Private Sector Participation Policy and Procedures
- BART Maintenance Program (1988)
- BART Affirmative Action Program (1986-1991 Update)

Progress for BART means being more productive and efficient; a match of **human and technological resources** that can yield quality service, better now than before. Productivity starts with individuals using a combination of talents, tools, and persistence to meet a challenge. To do a better job is to fulfill a basic human need to feel useful and to satisfy the desire to improve. As an organization, BART's challenge is to promote productivity and efficiency by providing a work environment and management style which perpetuate this desire.

PEOPLE MAKE THE DIFFERENCE

BART is people, a family of individuals related by common employment and engaged in a common purpose. Like a family, there is communication, responsibility, recognition, and a commitment to its members based on developing the human resources needed to advance the organization through personal achievement and group effort. A guiding philosophy, one which has served BART well, is that **the way to a more favorable "bottom line" is through the development of a "top-of-the-line" workforce.** This is evident in the caliber of people who make up BART's workforce, by its training and educational programs, and by career opportunities which reflect the organization's commitment to upward mobility and affirmative action. In short, people make the difference, and **investing in individuals** is a key aspect of BART's strategy for improving productivity and efficiency. Some investments yield immediate results. Others take more time. All are needed to nurture ideas and to produce effective actions and results.

Productivity is often presented in the context of projects and the ability to increase output at a rate greater than the commitment of resources. BART is no exception in this regard and, in fact, has developed its capital improvement program with productivity and efficiency as key justifying criteria. Equally as important is BART's emphasis on people. Sustaining favorable levels of productivity depend upon continued human dedication, the additive to technology that fuels progress.

BART's commitment to providing the best service possible to its customers applies, as well, to its employees, who are customers to one another. Because of this, efforts to increase productivity and efficiency will focus on developing the human resources and relations to advance BART in accordance with its mission and goals.

PUTTING KNOWLEDGE TO WORK

To BART, productivity and efficiency mean delivering quality transportation service where production costs are held in line relative to revenues. Accomplishing this requires knowledge about these two factors, **costs and revenues,** and implementing programs to bring desired results. Progress toward realizing increased productivity and efficiency is tracked by ten performance indicators. Five of these indicators consist of important revenue-cost ratios; four are service-output ratios; and one additional performance indicator tracks BART's effectiveness toward achieving its affirmative action objective for disadvantaged business enterprise participation. These ten performance indicators are summarized in the reference guide at the beginning of this chapter, and in Figures 2 and 3 which present all of BART's policy elements. Each productivity and efficiency indicator is discussed in the next section along with BART's supporting program objectives. Attention is given to the revenue-cost indicators for productivity and efficiency, since these constitute important budget considerations.

The **system operating ratio**, one of BART's key indicators for productivity and efficiency, measures total operating revenue relative to total operating expense. This is expressed as a percentage one which represents the portion of operating costs recovered by all sources of revenue. (Revenue sources consist of passenger fares and income derived from concessions advertising, interest, and other sources. Financial assistance from local taxes and other government funds is not considered as revenue and does not figure in the operating ratio.)

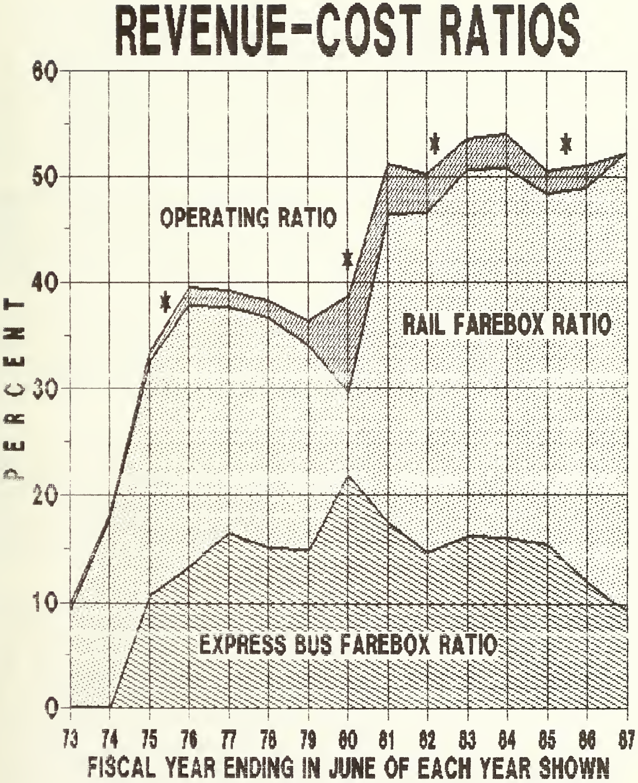
A second and similar revenue-cost indicator for productivity and efficiency is the **rail farebox ratio**, which is also expressed as a percentage and compares rail passenger revenue to rail operating costs. This ratio does not include passenger revenue or expense for transportation which is provided by BART through contract services. This is tracked separately by the **express bus farebox ratio**.

Figure 21 presents fiscal year averages for these three revenue-cost ratios since the startup of service. The profiles for the operating and rail farebox ratios are very similar. Both start out at the same low level when BART service first began and rise with increasing ridership. Growth in income starting in FY 1975/76 from advertising, concessions, and interest pushed the operating ratio a few percentage points above the rail farebox ratio. **Permance for both indicators gradually eroded during the latter 1970s under high inflation and constant fare levels.**

The service-disrupting effects of the transbay tube fire and labor dispute are seen as a widening gap between the operating and rail farebox ratios in fiscal years 1979/80 and 1980/81. During this period, erosion of ridership and passenger revenue had more of a negative impact on the rail farebox ratio. Finally the narrowing gap between these two indicators after FY 1980/81 is the result of **escalating express bus costs and reduced interest income**, both of which had an unfavorable impact on the operating ratio. The sharp increase for both the operating and rail farebox ratios between fiscal years 1979/80 and 1980/81 reflects the June 1980 fare increase, and a sharp gain in ridership and fare revenue in response to the start up of Richmond/Daly City service and additional service on other routes.

Improving BART productivity and efficiency hinge on controlling operating expenses relative to generating increased revenues from passenger fares and other sources. Because labor expense constitutes about two-thirds of BART's total operating budget, efforts to realize productivity gains will continue to focus on stepping up output with less than proportional staffing increases. Additionally, BART will continue to evaluate aspects of its operation for which private enterprise participation may provide cost advantages as well as preclude the addition of new BART positions. (Privatization is discussed under appropriate program areas in sections that follow.) The operating and rail farebox ratios have held fairly constant since FY 1982/83 and are currently just above 50%. This is consistent with **BART's goal to maximize the contribution to operating costs from passenger revenues, consistent with reasonable fare levels, to achieve a farebox ratio above 50%.** This contrasts

Figure 21



Fare increases are denoted by asterisks (*).

with declining productivity for BART express bus service, as reflected by decreasing farebox ratios since FY 1979/80.

From the revenue side, efforts to increase productivity clearly rest on BART's ability to stimulate ridership at fare levels that are reasonable. A clue to establishing fair and competitive pricing to increase ridership and revenue is to look at how "reasonable" BART's fares have been. Figure 22 shows the average BART fare paid by customers for each fiscal year. **When factored for inflation, the average fare of just over 50¢ per ride is no higher today than during BART's first year of operation.** Of course, in current dollars the increase of more than two and one-half times is readily apparent. This reflects the impact of inflation which has affected nearly all consumer goods and services by a factor of 2.7 between 1973 and 1987.

When the purchasing power of the dollar is considered, **BART fares have been kept in line** as Figure 22 shows. Customer perception, however, argues otherwise. Fare increases require an adjustment on the part of the customer, one which is just as much mental as economic. This suggests that future fare increases should be relatively small and implemented at more frequent intervals.

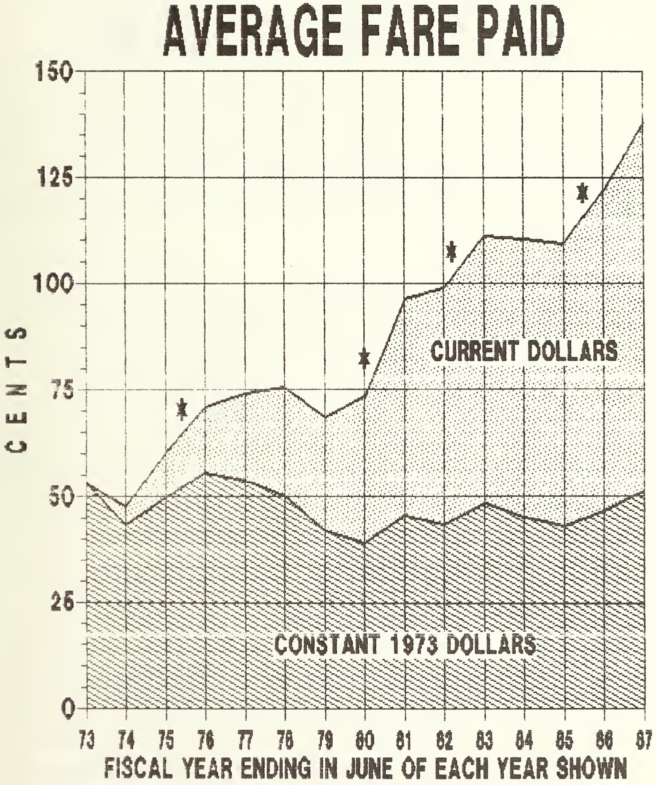
The decrease in BART's other income, primarily from falling interest earnings, further suggests that **ways need to be found to stimulate additional revenue.** Prospective sources include advertising, concessions, leases, and joint development. BART will be looking at options for increasing station productivity through innovative lease/concessions agreements with private businesses.

What about the cost side? How do BART's operating expenses compare relative to system use? How have the unit production costs changed over time and what are the key controlling factors? To help answer these questions, Figure 23 charts each fiscal year's **rail cost per passenger mile**. This measure is the third key indicator for productivity and efficiency, one which tracks service production costs relative to service consumption. As shown BART's rail cost **per passenger mile has experienced an overall decline when factored for inflation.**

This favorable trend is indicative of BART's ability to size trains to meet demand. This has a direct impact on labor and non-labor costs and reflects the degree of operational efficiency. This point is clearly illustrated in Figure 23 by the "spike" for FY 1973/74. As shown, BART's rail cost per passenger mile jumped more than three-fold in one year. This is because the start of service within San Francisco, prior to being granted the authority to carry passengers through the transbay tube, required shuttling empty trains between BART's three East Bay maintenance yards and the City. The net result of this was a disproportionate increase in operating costs relative to ridership. This situation was corrected in September 1974 when transbay service began and ridership increased sharply. As a result, BART's rail cost per passenger mile returned to an acceptably low level.

The key variable costs are electric power consumption and car maintenance, both of which are factors of the distance BART cars travel. More car miles mean higher power and maintenance expenses. Accordingly, **BART's load factor monitoring program is a vital part of the strategy for controlling these costs.** The effectiveness of this program is based on BART's ability to

Figure 22

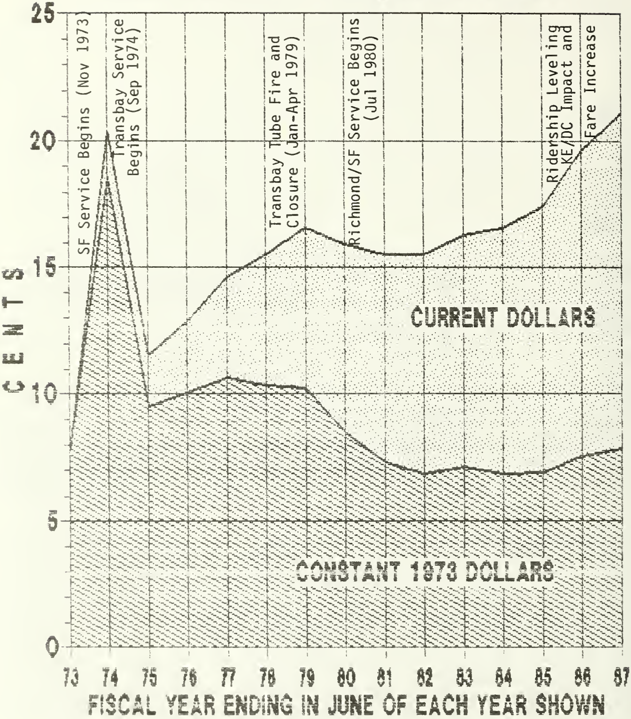


Fare increases are denoted by asterisks (*).

Range of BART fares and dates implemented:
Sep 1972, $0.25 - $1.25
Nov 1975, $0.30 - $1.60
Jun 1980, $0.50 - $1.75
Sep 1982, $0.60 - $2.15
Jan 1986, $0.80 - $3.00

Figure 23

RAIL COST PER PASSENGER MILE



capture both train and passenger flow data, summarize it in a meaningful way, and act in a timely manner. The importance of the load factor monitoring program with regard to improving productivity and efficiency is reflected by its repeated inclusion in BART's Productivity Improvement Program submittals to MTC.

Because of the sizable impact on operating expenses, the need for additional staff undergoes rigorous review as part of BART's annual budget cycle. New positions must be justified as essential for supporting higher service levels. Prior year budgeted positions are also reviewed and appropriate adjustments made. The results of this review, in terms of future BART staffing, are presented in Figure 24. To meet BART's service requirements, **165 positions will be added over the next five years.** Compared to now, this is a 7% increase in BART's workforce; people needed to help generate 29% more passenger revenue, maintain 35% more cars, operate 22% more trains, and provide peak period service at a frequency 53% higher than today.

ACTING ON OPPORTUNITIES

BART's strategy for increasing productivity and efficiency over the next five years is presented in the following sections by program area. BART's operating budget projections (which are discussed in detail in Chapter Four) are based on the anticipated results of these actions.

The **rail farebox ratio** is targeted at **49.6%** for FY 1988/89, and is forecast to hold steady at about 50% in the four out years of the current planning timeframe. The **system farebox ratio,** which includes express bus revenue and expense, is forecast to be **45.9%** for FY 1988/89 and is expected to hold to about 48% through FY 1992/93. The system **operating ratio** is targeted at **48.5%** for FY 1988/89, and is forecast to rise slightly and average just over 50% in the four out years. The **rail cost per passenger mile** is forecast to start out at **21.8¢** in FY 1988/89, and increase by an average annual rate of 2.7% per year for the next four years reaching 24.2¢ by FY 1992/93.

Specific actions, program objectives, and other performance indicators for productivity and efficiency are as follows.

*** Capacity and Reliability ***

One of the primary benefits of the **Capacity Expansion Program** is added operational flexibility which will allow BART to minimize expenses associated with vehicle maintenance and electric power. The completion of the **KE Track** in January 1986 was the first milestone for accomplishing this under the Capacity Expansion Program. The new mainline track and sidings in downtown Oakland have **reduced car miles and related expenses** as a result of its train storage capability.

The Daly City Turnback and C-cars will allow for even greater operational efficiency. The Turnback, like the KE Track, provides for storage of trains during the midday and at night, eliminating wasteful and unnecessary deadheading. The new C-cars will enhance efficiency further by allowing for quick train sizing. While crucial to adding new service, the combination of the KE Track, Daly City Turnback, and C-cars also permits more service to be operated with the addition of less than proportional car miles. That's why over the next five years car miles are projected to increase by only 13%, compared to a 35% expansion for BART's fleet, and providing maximum train frequencies 53% higher than today.

Figure 24

PROJECTED REQUIREMENTS FOR ADDITIONAL OPERATING STAFF POSITIONS*

		Incremental Positions as of June 30					
Department	Budget 87/88	88/89	89/90	90/91	91/92	92/93	5-Year Increase
GENERAL MANAGER	5.0	0.0	0.0	0.0	0.0	0.0	0.0
LEGAL	18.0	0.0	2.0	0.0	0.0	0.0	2.0
FINANCE	110.0	0.0	10.0	1.0	1.0	1.0	13.0
DISTRICT SECRETARY	4.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC AFFAIRS	12.0	0.0	0.0	0.0	0.0	0.0	0.0
SAFETY	14.0	0.0	0.0	0.0	0.0	0.0	0.0
EMPLOYEE RELATIONS	48.0	1.0	0.0	0.0	0.0	0.0	1.0
AFFIRMATIVE ACTION	8.0	(1.0)	0.0	0.0	0.0	0.0	(1.0)
PLANNING, BUDGET AND RESEARCH	30.0	(2.0)	0.0	0.0	0.0	0.0	(2.0)
MATL MGMT & PROCUREMENT	74.0	(2.0)	0.0	0.0	0.0	0.0	(2.0)
INFORMATION SYSTEMS	35.0	0.0	0.0	0.0	0.0	0.0	0.0
ADMINISTRATIVE SERVICES	32.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Admin. and Support Services	390.0	(4.0)	12.0	1.0	1.0	1.0	11.0
ADMIN & MAINTENANCE SUPPORT	117.0	6.0	0.0	0.0	0.0	0.0	6.0
COMMUNIC/COMPONENT REPAIR	157.0	3.0	0.0	2.0	2.0	1.0	8.0
ROLLING STOCK MAINTENANCE	316.0	39.0	9.0	0.0	0.0	0.0	48.0
POWER & WAY MAINTENANCE	465.0	13.0	7.0	15.0	3.0	0.0	38.0
ENGINEERING & CONSTRUCTION	52.0	2.0	0.0	0.0	0.0	0.0	2.0
Total Maintenance & Engineering	1,107.0	63.0	16.0	17.0	5.0	1.0	102.0
ADMIN, SUPP & ANALYSIS, BUS OPS	27.0	1.0	0.0	0.0	0.0	0.0	1.0
TRAIN OPERATIONS	319.0	17.0	11.0	1.0	0.0	0.0	29.0
STATION OPERATIONS	210.5	6.0	1.0	3.0	0.0	1.0	11.0
POLICE SERVICES	171.5	(1.0)	1.0	7.0	3.0	1.0	11.0
Total Field Services	728.0	23.0	13.0	11.0	3.0	2.0	52.0
Total Operations Departments	1,835.0	86.0	29.0	28.0	8.0	3.0	154.0
Total District	2,225.0	82.0	41.0	29.0	9.0	4.0	165.0
Cumulative Increase	--	82.0	123.0	152.0	161.0	165.0	

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* Includes part-time Train Operators, Station Agents, and Police Cadets at 1/2 position each.

Does not include capitalized or otherwise reimbursable labor. Negative entries for FY 88/9 generally reflect positions being converted from operating staff to reimbursable positions.

The policy regarding load factors greatly influences the degree of car mile savings which can be realized. As discussed in Chapter Two, this policy has been revised from one based on achieving a balance of peak train loads (under conditions of not having any additional cars) to one based on achieving a 1.00 average peak train load factor for those consists BART can alter (as determined by the allowable 3-car minimum and 10-car maximum train lengths). **BART's revised load factor policy effectively reduces overall train crowding by requiring that more cars be placed in service relative to what would have been needed under the load factor balancing objective.**

BART's load factor policy was revised for two reasons. First, the introduction of the C-cars and use of the Daly City Turnback will change how the system is operated. Current efforts to simulate operations under these new conditions show a need to provide slightly more capacity (e.g., longer trains) at first, and to gradually fine tune the system over time. The second reason BART's load factor policy was revised is based on planned marketing efforts which will focus on new service and capacity as key selling points for increasing ridership.

Achieving the revised load factor policy offsets some of the potential car mile savings which the Capacity Expansion Program provides. Accordingly, **the performance trend, as measured by BART's productivity and efficiency indicators, is projected to hold steady over the next five years** relative to today. **System utilization**, or the ratio expressed as a percent of passenger miles to seat miles, is forecast to be **32.5% in FY 1988/89**, and is projected to be just over 33% for the four out years. **Car miles per equivalent employee** are projected to **increase 0.8%** over the next five years, from **16,047** in FY 1988/89 to **16,567** in FY 1992/93. (One equivalent employee is based on 2,000 hours worked per year including overtime and excludes capitalized and other reimbursable labor hours.)

Future productivity gains with respect to capacity will depend largely on BART's ability to make full use of the capacity expansion projects now coming on line, as well as accepting higher load factors. Continued adherence to stringent preventative maintenance standards will also assist BART in increasing productivity and efficiency by assuring that equipment is in good working order and available for service.

*** Safety ***

Customer safety and security is paramount to favorable performance and maintaining public confidence in the system. Public perception of BART safety and security affects ridership (see Chapter One). Accidents also are reflected by BART's service delivery indicators (see Chapter Two). As such, efforts to maximize productivity and efficiency will focus on maintaining a safe and secure environment for train operations, stations, and parking facilities. This includes considerations from the perspective of customer safety as discussed in previous chapters, and from the perspective of employee safety as discussed below.

The most common industrial injuries involve falls, sprains, cuts, and hazardous materials. These constitute the greatest percentage of all employee accidents. The loss in productivity, as measured by **employee lost time**, is closely monitored. BART will continue its efforts to maintain high safety awareness among its employees through training and periodic reviews and updates of work procedures. Efforts in the current five year timeframe will focus on **reducing the total annual amount of employee lost time due to industrial injuries** as a percent of time worked to **0.50% or less**.

Another form of employee lost time is **sick leave**. BART will focus efforts to **promote employee wellness and control employee use of sick leave** to a rate **no higher than 3.50%** of time worked.

*** Access ***

The primary impact access improvements will have is to promote increased ridership. This has direct bearing on all of BART's ridership based productivity and efficiency indicators, which include the four revenue-cost ratios, rail cost per passenger mile, and system utilization. For details of BART's access program, refer to Chapter One of this document and the 1988 Capital Improvement Program which is under separate cover.

Privatization of BART express bus service, beginning in January 1989, presents an opportunity for improving productivity and efficiency. Future productivity will depend upon contractor performance (including the achievement of BART's **95% express bus ontime** objective) and the potential cost savings from contracting this service to lower cost bus operators.

*** Human Resources ***

A key aspect of BART's strategy to increase productivity and efficiency is the continued investment in its workforce. Emphasis will be given to the ongoing development of skills and management techniques necessary for advancing BART in terms of the achievement of its objectives. To assist in this effort, BART will implement practices and procedures to support its **customer service philosophy** beginning in FY 1988/89. The purpose of this program is to foster greater awareness on the part of employees of BART's need to deliver quality service. Individual performance and responsibilities, whether involving direct customer contact or supporting roles, will be redefined in terms of providing better service.

Human resource development also includes BART's commitment to **affirmative action**. Efforts will continue to focus on implementation of BART's updated Affirmative Action Program as a means of promoting upward mobility and achieving **workforce representation** objectives. As part of BART's commitment to affirmative action, efforts will also focus on productively engaging in contracting for goods and services with local minority owned businesses. BART will work to maintain **21% minority business enterprise participation** for all District contracts determined to have MBE opportunities, including **21% DBE participation** for all federally assisted contracts awarded during the year. Additionally, BART will work to achieve a minimum of **15% equity participation in joint development projects**. These projects are discussed below and in joint development sections in Chapters One and Two.

*** Joint Development ***

A primary purpose of BART's joint development program is to enhance the organization's revenue base by increasing the productivity of station areas. Methods for accomplishing this include leasing of land and/or air rights at stations, incorporating special station entrances into developments, and coordinating efforts with local jurisdictions for developing land adjacent to BART stations. This ties directly to one of BART's three mission statements to **maximize the return on its investments in property, rights-of-way, and**

facilities, and the supporting goal to **develop station area sites for the realization of increased patronage and revenues, and to enhance the communities BART serves.**

Activities for accomplishing this will focus on achieving two program objectives for FY 1988/89. These are to **complete station plans for Rockridge, Hayward, El Cerrito del Norte, and Bay Fair**, and to **execute a minimum of one ground lease.**

*** Concessions and Property Management ***

BART will be increasing efforts to realize more immediate productivity gains with regard to revenue generation of its property. This is reflected by the 73% increase in revenue from concession permits. This increase is based on favorable permit agreements with various firms with whom BART is currently negotiating. BART will continue to generate income through its property management program from the sale of unproductive land and the leasing of excess land.

In the current five year timeframe, BART will also pursue ways to increase other sources of non-passenger revenue. Opportunities exist for transforming stations into more vibrant activity centers containing a mix of retail and service businesses. BART owns and is in control of prime Bay Area real estate. Efforts to recover larger portions of operating expenses will depend, in part, upon how effective BART is in putting these assets to more productive use.

*** Extensions ***

Extensions of BART were discussed in Chapters One and Two with regard to providing rail links to currently unserved areas and tapping new markets. Depending upon ridership and revenue potential versus operating costs, each extension also presents an opportunity for enhancing BART productivity and efficiency. In short, an extension which can generate a farebox ratio greater than the current system presents itself as an opportunity for increasing BART productivity and efficiency. Additionally, extensions present an opportunity to take advantage of BART's economy of scale in terms of the investment already in place for fixed facilities and human resources.

CHAPTER FOUR:

FIVE YEAR FINANCIAL PLAN

- FY 1988/89 Operating Budget
- Five Year Operating Budget Plan Elements
- Financial Capacity Analysis
- Capital Program Overview

FIVE YEAR FINANCIAL PLAN

HIGHLIGHTS

- BART's operating budget has been developed on the basis of achieving its objectives and supporting service expansion.
- Total operating expense is projected to be $177.5 million in FY 1988/89, increasing at an average annual rate of 5.1% to $217.0 million in FY 1992/93.
- The percentage share of total operating expense for major budget items include: net labor, 70% throughout the five year period; electric power, 9% in FY 1988/89 and increasing to 10% by FY 1992/93; purchased transportation, 8% in FY 1988/89 and decreasing to 7% by FY 1992/93; and other non-labor, 13% throughout the five year period.
- Net rail passenger revenue is projected to be $80.7 million in FY 1988/89, increasing at an average annual rate of 5.8% to $101.2 million in FY 1992/93, including the effect of an assumed 12.5% increase in fares beginning March 1990.
- Total operating revenue (including rail and express bus passenger revenue and other operating revenues) is projected to be $86.1 million in FY 1988/89, increasing 5.8% per year on average to $108.1 million in FY 1992/93.
- Financial assistance is projected to be $87.4 million in FY 1988/89, increasing at an average annual rate of 5.3% to $107.3 million in FY 1992/93.
- Debt service, capital, and other allocations from BART's operating budget are projected to be $18.7 million in FY 1988/89 and increasing 1.4% annually to $19.8 million in FY 1992/93.
- Deficits for BART's operating budget start out at $4.0 million in FY 1988/89, reducing to $1.7 million in FY 1992/93.
- BART's capital budget for the five year period is projected to be $874 million for system improvements other than extensions which, in 1988 dollars, are estimated to add another $1,104 million to BART's capital program.
- BART's strategy for balancing its budget and minimizing the need for additional fare increases will consist of the following options: stimulate additional ridership, generate other revenues, reduce operating expenses, defer service expansion, increase share of MTC allocation, reduce transfer payments, consolidate service, and/or reduce capital allocations.

PERFORMANCE INDICATORS

(See Chapter Three, Productivity and Efficiency, and the financial and TDA indicators presented in Figure 25).

REFERENCE DOCUMENTS

- BART Interim FY 1988/89 Operating Budget
- BART Budget Performance Reports, FY 1987/88
- BART FY 1986/87 Annual Report
- BART 1988 Capital Improvement Program (CIP)

Provision of existing and expanded service depends on a sound financial structure, both for operations and capital improvements. Based on the foregoing performance objectives for the five year period, it is the purpose of this chapter to identify the financial requirements for implementing proposed improvements and service expansion, to highlight problems limiting implementation, and to recommend feasible solutions in the form of a five year financial plan.

FY 1988/89 OPERATING BUDGET

The interim FY 1988/89 **operating budget has been developed to meet BART's goals and objectives.** The interim budget is summarized in Figure 25 along with actual figures for FY 1986/87, FY 1987/88 budget and actual, and projections for the upcoming five year period. Year-to-year comparisons presented below are in terms of the adopted FY 1987/88 budget.

The budget for FY 1988/89 anticipates net **fare revenues** of $81.5 million with a rail farebox ratio of 49.6%, and **other operating revenues** of $4.6 million, resulting in an operating ratio of 48.5%. (As noted above, after labor negotiations are complete and new contracts are signed, it is anticipated that the FY 1988/89 budget will be revised to include an operating ratio of at least 50%.)

Property tax receipts are estimated at $8.6 million, and **sales tax** receipts are forecast at $96.8 million.

Operating expenses are anticipated to increase by $5.6 million (3.3%) from the FY 1987/88 budget to $177.5 million for the year.

Net **labor cost** is expected to increase $8.4 million (7.3%). Labor cost reflects estimated wage and fringe benefit increases. The increase in this item also includes the cost of 60 new operating positions. Of these, 50 will support new service and 10 will be for improvements to current service.

The cost of the **express bus and shuttle program** is expected to decrease by $1.3 million, reflecting projected costs under a new contract with a private firm beginning January 1989. **Transfer payments** to AC Transit are expected to cost $6.2 million. In accordance with the regional transit financial planning agreement among BART, the two other major transit operators and MTC, transfer payments will also be made to MUNI for $1.3 million.

Traction and station **power cost** is expected to be $1.5 million lower than the cost budgeted for FY 1987/88. Other non-labor expense is expected to decrease by $0.4 million. Expected receipts of financial assistance through MTC of $0.3 million SB-1335 (STA) and $0.4 million TDA funds are budgeted.

As called for in last year's Five Year Plan, certain capital expenditures are also to be funded from operating sources. **Capital allocations** totalling $4.4 million are budgeted for improvement allowance ($2.5 million) and planning and station area development ($1.9 million). The operating budget will also fund debt service allocations **of $14.3 million for the revenue bond debt service.**

After these allocations have been budgeted, **total operating uses exceed sources by $4.0 million.**

Figure 25

FIVE-YEAR OPERATING BUDGET FORECAST, 88/89-92/93; 12.5% FARE INCREASE ASSUMED MARCH 1990;
(TO BE REVISED: FY 1988/89 BUDGET REVISION TO YIELD 50% OPERATING RATIO)

08/18/88	Actual 1986/87	Budgeted 1987/88	Actual 1987/88	Interim Budget 1988/89	Projected 1989/90	Projected 1990/91	Projected 1991/92	Projected 1992/93
REVENUES ($000)								
Net Rail Revenue (12.5% Increase, March 1990)	76,915	78,295	77,755	80,718	86,178	94,027	97,648	101,186
Express Bus Revenue	739	860	719	740	777	816	857	900
Net Passenger Revenue	77,654	79,155	78,474	81,458	86,955	94,843	98,505	102,086
Interest Earnings	4,848	4,378	3,677	2,112	1,916	1,916	1,916	1,916
Other Revenue	2,122	2,117	1,972	2,491	2,859	2,987	3,640	4,070
Other Operating Revenue	6,970	6,495	5,649	4,603	4,775	4,903	5,556	5,986
Net Operating Revenues	84,624	85,650	84,123	86,061	91,730	99,746	104,061	108,072
EXPENSES ($000)								
Net Labor	110,929	115,334	116,064	123,774	130,024	136,808	143,763	150,455
Electric Power	17,075	18,100	14,709	16,555	16,457	18,656	21,004	22,045
Other Non-Labor	18,890	22,683	21,236	22,328	23,863	25,543	27,193	28,706
Express Bus	8,068	8,354	8,455	6,984	6,443	6,443	6,443	6,443
BART Shuttles	157	256	228	314	329	346	363	381
Bus Operator Transfer Subsidies	7,083	7,083	7,083	7,502	7,872	8,157	8,565	8,993
Total Operating Expenses	162,202	171,810	167,775	177,457	184,988	195,953	207,331	217,023
OPERATING DEFICIT ($000)	(77,578)	(86,160)	(83,652)	(91,396)	(93,258)	(96,207)	(103,270)	(108,951)
FINANCIAL ASSISTANCE ($000)								
Property Tax Revenues	7,412	7,639	8,226	8,581	9,011	9,461	9,934	10,431
Sales Tax Revenues (BART 75% Share)	87,091	89,091	92,243	96,792	100,296	105,310	110,576	116,105
TDA ('BART Only')	548	348	348	370	383	403	422	444
STA, Other State Funds	479	1,911	77	305	77	77	77	77
Debt Service Allocations	(13,474)	(12,568)	(12,595)	(14,325)	(14,328)	(14,384)	(14,446)	(14,502)
Capital and Other Allocations	(4,505)	(4,708)	(4,708)	(4,370)	(4,570)	(4,771)	(5,036)	(5,276)
Total Financial Assistance	77,551	81,713	83,592	87,353	90,869	96,095	101,527	107,278
NET FINANCIAL RESULT ($000)	(27)	(4,447)	(60)	(4,043)	(2,389)	(112)	(1,743)	(1,673)
FINANCIAL INDICATORS								
Annual Patronage (000)	56,241	58,369	57,596	59,370	60,863	61,546	63,917	66,232
Annual Passenger Miles (000)	695,944	733,600	722,583	746,173	765,045	773,637	803,432	832,539
Annual Vehicle Hours (000)	1,111	1,103	1,148	1,165	1,164	1,204	1,233	1,250
Annual Vehicle Miles (000)	30,267	30,203	31,393	31,918	31,890	32,980	33,778	34,244
Equivalent Employees (Operations)	1,922	1,932	1,924	1,989	2,014	2,052	2,064	2,067
Fare Box Ratio: Rail Only	52.4%	50.2%	51.2%	49.6%	50.6%	51.9%	50.9%	50.3%
Fare Box Ratio: Express Bus Service	9.2%	10.3%	8.5%	10.6%	12.1%	12.7%	13.3%	14.0%
Fare Box Ratio: Total System	47.9%	46.1%	46.8%	45.9%	47.0%	48.4%	47.5%	47.0%
Operating Ratio	52.2%	49.9%	50.1%	48.5%	49.6%	50.9%	50.2%	49.8%
Rail Cost Per Passenger Mile	$0.211	$0.213	$0.210	$0.218	$0.226	$0.237	$0.240	$0.242
TDA INDICATORS								
Rail Cost Per Vehicle Hour	$132.23	$141.54	$132.40	$139.50	$148.23	$152.28	$156.53	$160.94
Rail Cost Per Passenger	$2.61	$2.67	$2.64	$2.74	$2.83	$2.98	$3.02	$3.04
Passengers Per Vehicle Mile	1.86	1.93	1.83	1.86	1.91	1.87	1.89	1.93
Passengers Per Vehicle Hour	50.63	52.92	50.17	50.95	52.29	51.11	51.84	52.98
Vehicle Hours Per Equivalent Employee	578.1	570.8	596.6	585.8	577.9	586.7	597.5	604.9
CAPITAL AND DEBT SERVICE ALLOCATIONS ($000)								
Revenue Bond Debt Service	12,586	12,568	12,595	14,325	14,328	14,384	14,446	14,502
Sales Tax Anticipation Note Debt Service	888	0		0	0	0	0	0
Improvement Allowance	3,100	3,100	3,100	2,500	2,614	2,729	2,886	3,024
Extension Planning				488	511	533	564	591
Other Planning	1,405	670	670	730	763	798	835	873
Joint Development	0	938	938	652	682	712	752	789
Total Capital and Debt Service Allocations	(17,979)	(17,276)	(17,303)	(18,695)	(18,898)	(19,155)	(19,482)	(19,779)

FIVE YEAR OPERATING BUDGET PLAN ELEMENTS

Over the five year period, **labor cost** is anticipated to constitute **70%** of BART's operating budget, with the remaining **30%** for **non-labor** items. The operating budget plan in Figure 25 includes two components of labor expense, the current base and that which is required for expanded service. The base includes those positions which are needed to maintain current service. Over the five year period, some new positions will have to be added for this purpose. However, most of the increase in the base reflects the cost of anticipated improvements in wages and benefits as covered by new contracts which are to be negotiated during this five year cycle. Maintaining current employee benefits over the five year period and providing the additional positions needed to continue existing service are also included.

Non-labor expense includes two major items: electric power and purchased transportation (express bus, shuttle and feeder service), and a variety of other lesser items.

The forecasting of future power cost increases is subject to a considerable degree of uncertainty given the large number of influencing factors. These include decisions made at the state and federal levels concerning atomic power plant certification and international political developments which affect the price and/or availability of oil. Another significant factor is the magnitude of available hydroelectric resources as determined by the Sierra snowpack. The **power cost associated with providing the current level of service is expected to increase by an average of 5.7% annually.** Snowpack and fuel price levels, together with the availability of electric power from alternate sources, will impact future BART power cost estimates. Alternate sources of power are being evaluated and future cost projections may be affected.

All **other non-labor expense items are expected to increase by an average of 4.6% annually** to maintain current service. This rate approximates the projected annual increase in the CPI. Actual increases are greater due to the additional service planned.

BART passenger growth was documented above in Figure 4 (see Chapter One). For financial planning purposes, **a 12.5% fare increase is assumed** beginning March 1990. This increase approximates the projected growth in the CPI. Other operating revenue is expected to be somewhat lower than previously budgeted because of declining interest rates on investment of operating funds and the impact of the new tax laws on tax anticipation notes.

For the upcoming five year period, BART's **sources of financial assistance** are forecast to grow at somewhat lower rates than were assumed in last year's plan, reflecting slower economic growth. **Sales tax** yields are projected to expand by 4.9% in FY 1988/89, 3.6% in FY 1989/90 and 5% each year thereafter. This is based, in part, on the projected statewide growth forecast by the Commission on State Finance, as adjusted for historically lower growth in the three BART counties. **Property tax** revenues are expected to increase by 6.1% in FY 1988/89 and 5% each year thereafter.

Discretionary financial assistance, which is allocated to BART by MTC, is likewise projected at significantly different levels in this year's Five Year Plan, based on the preliminary allocation estimate furnished earlier this year. This estimate calls for only $0.3 million of STA funds and $0.4 million

Figure 26

1988 BART FIVE YEAR PLAN OPERATING PARAMETERS AND FORECASTS

	INTERIM	FORECAST			
SERVICE DEMAND	FY 1988/89	FY 1989/90	FY 1990/91	FY 1991/92	FY 1992/93
Total Passenger Trips (1,000s)	59,370	60,863	61,546	63,917	66,232
Average Weekday Trips (1,000s)	207	211	214	222	231
Passenger Miles (1,000s)	746,173	765,045	773,637	803,432	832,539
SERVICE DELIVERY					
Minimum Scheduled Headway (min:sec)*	3:10	3:10	2:15	2:15	2:15
Peak Period Trains Online*	51	51	55	55	55
Peak Period Cars Online*	365	365	441	452	452
Car Hours (1,000s)	1,165	1,164	1,204	1,233	1,250
Car Miles (1,000s)	31,918	31,890	32,980	33,778	34,244
PRODUCTIVITY & EFFICIENCY					
Net Operating Revenue (1,000s)	$86,061	$91,730	$99,746	$104,061	$108,072
Total Operating Expense (1,000s)	$177,457	$184,988	$195,953	$207,331	$217,023
System Operating Ratio	48.5%#	49.6%	50.9%	50.2%	49.8%
Rail Farebox Ratio	49.6%	50.6%	51.9%	50.9%	50.3%
Rail Cost Per Passenger Mile	21.8¢	22.6¢	23.7¢	24.0¢	24.2¢
Equivalent Operating Employees**	1,989	2,014	2,052	2,064	2,067

*Maximum service level programmed during respective fiscal years. # See "A Special Note," page 9.

**One equivalent employee is equal to 2,000 hours worked per year, excluding capitalized labor and other reimbursable labor hours.

of TDA funds. For purposes of the current financial plan, TDA funds are expected to grow at the rate indicated above for BART sales tax revenues. The FY 1988/89 STA allocation reflects a one-time prior year carryover. Due to uncertainty about the continuation of the STA program beyond the one-year extension now being considered by the Legislature, funds projected from this source for subsequent years are expected to remain at the level realized in FY 1987/88.

According to the projections in Figure 25, the five year financial outlook is reasonably positive, assuming that fares are increased by 12.5% in March 1990. Manageable deficits are projected for the first two years, followed by an essentially balanced budget in the third year, with a full year of increased fare revenue. Annual deficits on the order of $1.7 million are projected for the final two years. **This outcome depends heavily on realization of anticipated ridership growth, and the forecast savings in power and express bus expense** (vis-a-vis earlier projections).

The plan assumes that the revenue bond debt service requirements will be funded each year by an allocation from the operating budget. This and other debt service requirements are summarized in Figure 27.

FINANCIAL CAPACITY ANALYSIS

The information in Figure 25 and the accompanying text of the draft of this plan was utilized by the Metropolitan Transportation Commission in an analysis of the financial capacity of all transit operators in this region. Based on this analysis, MTC determined that BART has the financial capacity to carry out its current operating and capital plans.

CAPITAL PROGRAM OVERVIEW

BART's five year capital improvement program for all projects other than extensions will require $873.8 million, 75% of which is already funded. With funding for all capacity expansion projects now complete, the focus will shift to securing resources for implementing BART's $229.5 million access program which is currently 23% funded. Replacement and rehabilitation projects totalling $166.1 over the next five years are 75% funded. Figures 28 and 29 summarize BART's Basic Capital Program. The former presents financial requirements by source and use. The latter presents cash flows by project category.

Funding for Phase I BART extensions in Alameda and Contra Costa counties and a BART commitment for a MUNI Metro extension in San Francisco is projected to require $1,104.3 million, 71% of which is currently unfunded. (Unlike the Basic Capital Program projections, which have been inflated, Extension Program figures are presented in 1988 dollars.) Projected funding requirements include considerations for extensions planning and purchase of rights-of-way. Figures 30 and 31 summarize BART's Extensions Program, presenting funding uses and sources, and projected cash flows, respectively. A summary of BART reserve cash balances is presented in Figure 32. (See BART's 1988 Capital Improvement Program for additional information regarding all projects and costs in the current five year timeframe.)

Figure 27

FIVE YEAR PLAN DEBT SERVICE SUMMARY
(Thousands of Dollars)

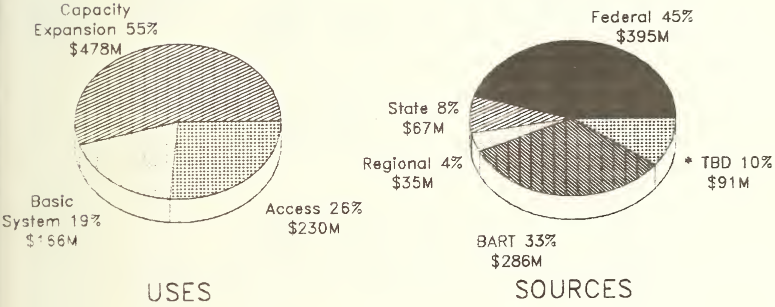
	ACTUAL FY 87/88	INTERIM BUDGET FY 88/89	FORECAST FY 89/90			
			FY 89/90	FY 90/91	FY 91/92	FY 92/93
Debt Service Expense						
General Obligation Bond Interest Redemption	54,737	55,311	55,443	47,189	47,096	46,972
SSD #1 Bond Interest and Redemption	736	736	735	733	730	735
Revenue Bond Debt Service	12,595	14,325	14,328	14,384	14,446	14,502
Total Debt Service Requirements	68,068	70,372	70,506	62,306	62,272	62,209
Sources of Funds						
General Obligation Bond Interest and Redemption Fund	54,737	55,311	55,443	47,189	47,096	46,972
SSD #1 Bond Interest and Redemption Fund	736	736	735	733	730	735
Allocation from Operating Budget for Revenue Bond Debt Service	12,595	14,325	14,328	14,384	14,446	14,502
Total Sources of Funds	68,068	70,372	70,506	62,306	62,272	62,209

Figure 28

BART BASIC CAPITAL IMPROVEMENT PROGRAM

EXISTING & PROPOSED FUNDING

(Does Not Include Extensions)



TOTAL: $874 Million

NOTE:

* TBD (To Be Determined) - Access projects yet to be funded.

Figure 29

FIVE YEAR FUNDED AND UNFUNDED CASH FLOW SUMMARY:

BASIC CAPITAL IMPROVEMENT PROGRAM

(Thousands of Dollars)

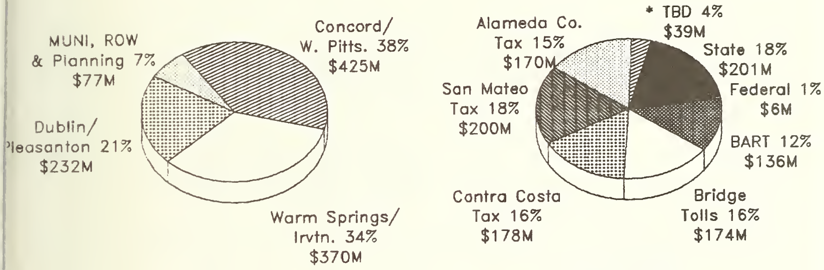
	Prior Years	1988/89	1989/90	1990/91	1991/92	1992/93	5+ YEARS	TOTAL
ACCESS								
Funded	4,539	12,055	21,053	12,495	474	0	2,602	53,218
Unfunded	0	0	0	0	0	17,046	159,236	176,282
CAPACITY EXPANSION								
Funded	291,935	156,221	28,870	0	0	0	0	477,026
Unfunded	0	0	0	0	0	0	1,170	1,170
BASIC SYSTEM REQUIREMENTS								
Funded	44,432	32,520	15,039	8,504	8,948	14,826	0	124,269
Unfunded	50*	4,644**	18,122	546	868	0	17,595	41,825
SUBTOTAL								
Funded	340,906	200,796	64,962	20,999	9,422	14,826	2,602	654,513
Unfunded	50	4,644	18,122	546	868	17,046	178,001	219,277
GRAND TOTAL	340,956	205,440	83,084	21,545	10,290	31,872	180,603	873,790

* Funding to be determined for programmed AFC related projects.

** Section 9 funding for procurement of maintenance/service vehicles and equipment.

Figure 30

BART EXTENSIONS PROGRAM
WITHIN BART DISTRICT
EXISTING & PROPOSED FUNDING



USES

SOURCES

TOTAL: $1,104 Million (Current Dollars)

NOTES (Uses):

1. Phase I construction costs are $1.027 million. The $77 million balance is for MUNI, right-of-way, and planning for Phases I, II, and III.
2. Funding to escalate to match cost inflation.

NOTES (Sources):

1. Sources for inside the District Phase I extensions are as proposed in MTC Resolution #1876.
2. *TBD (To Be Determined) are unfunded project costs associated with Phase II and III extensions right-of-way purchases.
3. Includes $39.411 million in BART funds already expended on Phase I, II, and III right-of-way and planning.
4. Funding to escalate to match cost inflation.

Figure 31

FIVE YEAR FUNDED AND UNFUNDED CASH FLOW SUMMARY:

EXTENSIONS PROGRAM

(Thousands of 1988 Dollars)*

	Prior Years	1988/89	1989/90	1990/91	1991/92	1992/93	5+ YEARS	TOTAL
PLANNING & CONSTRUCTION**								
Phase I Funded	39,487	3,490	1,806	21,911	28,957	41,126	161,506	298,283
Phase I Unfunded	0	13,625	19,934	21,369	49,763	110,424	535,284	750,399
PHASE I SUBTOTAL	39,487	17,115	21,740	43,280	78,720	151,550	696,790	1,048,682
PLANNING & ROW***								
Phase II/III Funded	2,371	4,231	5,845	0	0	0	4,100	16,547
Phase II/III Unfunded	0	20,909	8,128	5,000	5,000	59	0	39,096
PHASE II/III SUBTOTAL	2,371	25,140	13,973	5,000	5,000	59	4,100	55,643
SUBTOTAL								
Funded	41,858	7,721	7,651	21,911	28,957	41,126	165,606	314,830
Unfunded	0	34,534	28,062	26,369	54,763	110,483	535,284	789,495
GRAND TOTAL	41,858	42,255	35,713	48,280	83,720	151,609	700,890	1,104,325

* Funding to escalate to match cost inflation. Extension construction costs are based on Planning estimates.

** Phase I includes all tasks.

*** Phases II and III include right-of-way and planning only.

Figure 32

SUMMARY OF BART RESERVE CASH BALANCES

(Estimate in $000's for 1993)

	Line Item	Cumulative Total
Cash Balances (As of June 30, 1988)		253,521
- General Construction (Fund 01)*	23,564	
- Basic System Completion (Fund 01)*	10,413	
- System Improvement Reserve	2,858	
- Revenue Bond Construction Fund	194,746	
- Vehicle Fire Hardening Reserve	307	
- Interest Transfer Fund	6,645	
- DC Reserve/Full Funding Agmt.	20	
- Multi-Year Capital Allocations	3,113	
- Extensions Right-of-Way Reserve	3,354	
- Improvement Allowance	8,501	
Capital Allocations from Operating Budget		24,026
Interest		43,496
Total Available Funding		**321,043**
Less Programmed Expenditures		
BART Obligations, Local Shares, and Costs Unavailable from Grant Sources, and Net Project Costs		(177,139)
Extensions		(128,503)
Phase I construction	(69,500)	
Escalation	(31,670)	
Muni Metro	(15,000)	
Phase I, II, III Planning & ROW	(12,333)	
Contingency Funds (Balance)		
- DC Full Funding Grant Agreement		(20)
- Grant Contingency		(15,381)
Total Programmed Expenditures		**(321,043)**

* Interest accrues to the GO Bond Fund and is available in the five year period; however, reserve balances do not change from year to year to reflect this since the interest does not actually accrue to the specific reserve.

GLOSSARY

AB-842 PROCESS: State mandated annual financial planning process involving BART, AC Transit, MUNI, and MTC; for the purpose of minimizing budget deficits and allocating the 25% share of the 1/2¢ sales tax in the BART District counties.

A-CAR: A train control equipped vehicle which may be used as the first and last car on each train.

AFC: Automatic fare collection equipment including entry/exit gates, ticket vendors, change machines, etc. Performance is measured in terms of the number of equipment problems which cannot be corrected by station agents per 1,000 passenger trips.

AVERAGE WEEKDAY: Having typical commute day characteristics. Used as the basis to compare actual versus forecast patronage.

BALANCE OF PEAK PERIOD TRAIN CYCLE (also see PEAK TRAIN CYCLE): A unit of time used to define the "shoulder" period occurring just before and after the peak one hour. A 2-hour and 27-minute train cycle less the one-hour peak.

BART EXPRESS BUS SERVICE: BART funded bus service linking outlying Eastbay communities to the rail system. This service is provided through a purchase of service agreement.

B-CAR: A vehicle which does not contain train control equipment and is used in conjunction with A- or C-cars to form a train. A BART train may contain up to 8 B-cars.

CAPACITY EXPANSION PROGRAM: BART's strategy for increasing service and capacity which has focused on the implementation of about 12 key capital projects since the early 1980s.

CAPITAL IMPROVEMENT PROGRAM (CIP): A companion document to the Five Year Plan which identifies all of BART's capital projects and the financial plan for their implementation.

CAR COUNT: The number of A-, B-, or C-cars available for service.

CAR HOUR: One vehicle (A-, B-, or C-car) in service for a period of one hour.

CAR MILE: One vehicle (A-, B-, or C-car) which travels a distance of one mile.

C-CAR: A second generation transit vehicle developed as part of BART's Capacity Expansion Program which can be used as a leading/trailing or a mid-train car.

CONSIST: Used interchangeably with train.

DEADHEAD: Mainline train movements which do not provide passenger service and are non-revenue generating.

DELAY EVENT: Any occurrence which causes one or more trains to be delayed. Beginning in FY 1988/89, the District's monitoring program is conducted using a five minute delay threshold.

DISCOUNT TICKET: A BART ticket which sells for less than the magnetically stored face value. Discounts range from 6.25% for high value regular adult tickets to 90% for children 5-12 and adults 65 years of age and older, and qualifying handicapped persons.

EMERGENCY PLAN EXERCISE: Exercises coordinated and conducted by BART in cooperation with emergency service providers for the purpose of minimizing response times through familiarization of the system.

EMPLOYEE LOST-TIME INJURY: Any injury which results in the loss of one 8-hour work shift or more. Lost time as a result of an industrial injury may occur in the same quarter as the injury itself, or in later quarters as for many long-term disabilities.

EMPLOYEE LOST-TIME RATE: The ratio, expressed as a percent, of lost-time hours to total hours worked.

EMPLOYEE PAID SICK LEAVE RATE: The percentage of paid sick leave hours to paid straight-time hours.

EQUIVALENT EMPLOYEE: A unit of labor based on 2,000 hours worked annually, excluding all capitalized or otherwise reimbursed hours.

ESCALATOR AVAILABILITY: The ratio expressed as a percentage of the number of unit-hours escalators are actually in service to the maximum possible unit-hours during the time the system is open for business. (Elevator availability to be monitored on same basis beginning FY 1988/89.)

FAREBOX RATIO: The percentage of net passenger revenue (gross passenger revenue less special fare discounts and other deductions) of total operating expenses. Rail farebox ratio excludes revenue and expense for BART funded bus operations.

FAST PASS: A monthly pass valid for unlimited travel within San Francisco on BART and MUNI.

GOAL: A desired state toward which efforts are directed.

HEADWAY: The time interval between trains, usually expressed in minutes and seconds, which defines a level of service.

JOINT DEVELOPMENT: A cooperative land-use planning and implementation program which seeks to develop station areas into multi-use activity centers where people have an alternative to automobile travel.

KEY PERFORMANCE INDICATOR: High-level performance measures selected on the basis of best overall indication of train service quality, fare equipment dependability, patron response, and financial performance.

LOAD FACTOR: The ratio of on-board passengers to seats. An index of train occupancy, usually measured at a maximum load point.

MAXIMUM LOAD POINT: The point on each train route through which the train passes with the highest number of passengers during a given unit of time in one direction.

MISSION STATEMENT: Declaration of primary tasks.

OFFPEAK PERIOD: All revenue service times other than during weekday morning and afternoon peak train cycles.

OFF-SITE TICKET SALES OUTLET: Participating banking institutions, businesses, and social service agencies which sell BART high value and discount tickets.

OPERATING RATIO: The percentage of total net passenger and other operating revenues of total operating expenses.

PASSENGER MILE: One passenger traveling a distance of one mile.

PATRON ACCIDENT: A filed report of an injury to a patron having occurred on board trains, in station areas, or on other District property. The District's accident rate is expressed as the ratio of reported incidents related to train operations and stations per million passengers carried.

PATRON ON-TIME PERFORMANCE: A measure of service quality reflecting, as a percentage, the ratio of patron trips on time (arrival within 5 minutes of normal time) to total trips for all days. The published timetable is offset one minute earlier than the normal train arrival times.

PEAK HOUR: A 60-minute interval during which time patronage is at its maximum.

PEAK PERIOD: An interval of time consisting of the peak one hour plus the "shoulder" demand periods both before and after the peak hour.

PEAK TRAIN CYCLE: The period of time during which all vehicles available for peak service pass a given point on the system (for load factor monitoring this period is defined as 2 hours and 27 minutes).

PROGRAM AREA: Functional areas of the organization which reflect the concerns expressed in BART's mission statement and goals.

PROGRAM OBJECTIVE: Directive which focuses on the implementation of higher level capital projects and/or activities by specified completion dates.

RAIL COST PER PASSENGER MILE: A financial indicator measured by the ratio of rail operating expense (total operating expense less express bus and shuttle bus costs) for a given period to the number of passenger miles carried on the rail system during the same period.

RELIABILITY IMPROVEMENT PROGRAM (RIP): A program completed in the early 1980s which focused on modifying key components to bring performance to within acceptable standards.

SYSTEM UTILIZATION: A measure of system efficiency as derived by the ratio of passenger miles to seat miles. Equivalent to an average system load factor or average rate of seat occupancy.

THROUGHPUT: The number of cars, trains, or passengers passing a point on the system during a given unit of time in one direction.

BART FARE COMPONENTS AND TICKET PRICES
(As of September 1988)

TRIP LENGTH:	Up to 6 miles	$0.80
	Between 6 and 14 miles[1]	$0.92 + $0.069/Mile
	Over 14 miles	$1.47 + $0.041/Mile
SURCHARGE:	Transbay	$0.45
	Daly City[2]	$0.52
SPEED PREMIUM:	Extra charge for faster (or fare reduction for slower) than average trips; based on scheduled travel time	+/- $0.025/Minute
RESULTING FARES:[3]	Range	$0.80 to $3.00
	Average[4]	$1.70
SPECIAL FARES:[5] & DISCOUNTED TICKETS:	Children under 5 (No Charge)	$0.00
	Children 5 through 12 (90% discount)	$1.60 ($16.00 Value)
	Persons 65 and over (90% discount)	$1.60 ($16.00 Value)
	Qualifying handicapped (90% discount)	$1.60 ($16.00 Value)
	Regular adult (6.25% discount)	$30.00 ($32.00 Value)
	Excursion (entry/exit, same station)	$2.60
SEMIMONTHLY PASS:[6]	BART ticket combined with AC Transit Semimonthly Pass (unlimited AC use)	8 denominations from $20.00 to $53.00
MONTHLY PASS:[7]	Unlimited monthly BART/MUNI travel within San Francisco	$28.00
EXPRESS BUS: (1 Zone/2 Zone)	Children under 5 (no charge)	$0.00
	Children 5 through 12	$0.15/$0.30
	Regular adult	$0.75/$1.15
	Persons 65 and over	$0.15/$0.30
	Qualifying handicapped	$0.15/$0.30
TRANSFERS:[8]	BART Express Bus (leaving rail station)	$0.75 Value
	SF MUNI (per MUNI round trip)	$0.85 Value
	AC Transit (per AC round trip) -- Peak[9]	$0.50 Value
	Off-peak	$0.90 Value
	CCC Transit Authority (leaving rail station)	$0.35 Value

NOTES:

1. Trips over 6 miles within East Bay Suburban Zone (Concord-Orinda, Fremont-Bay Fair, Richmond-Ashby) priced at fare indicated for trips under 6 miles.
2. Does not apply to transbay trips.
3. Resulting fares are rounded to nearest 5¢ and encoded in automatic fare collection equipment.
4. Weighted by all BART-ticketed trips (excludes BART/MUNI Fast Pass trips) which average 13.9 miles.
5. Discounted multiple-ride tickets are sold at off-site BART ticket outlets and are not available from station ticket vending machines.
6. Includes last ride bonus feature on BART which allows any trip if remaining balance equals 5¢. Demonstration program effective February 1987.
7. The BART/MUNI Fast Pass is available at all San Francisco MUNI pass outlets.
8. In addition to those shown, transfers are also available for transit services which connect with BART but operate primarily outside the three-county BART District.
9. Weekdays 6 - 9 a.m. and 4 - 7 p.m. At time of printing AC is considering changes in transfer pricing.

BART FARES ($) AND TRAVEL TIMES (minutes)

Fares

Daly City	1.30	1.30	1.30	1.30	1.45	1.45	1.45	1.45	1.85	2.85	2.70	2.60	2.45	2.25	2.00	2.35	2.25	2.15	2.10	2.05	2.00	1.95	1.90	1.90	1.90	2.05	2.15	2.25	2.35	2.50	2.65	2.85	3.00
5	Balboa Park	0.80	0.80	0.80	0.80	0.80	0.80	0.80	1.75	2.80	2.60	2.55	2.40	2.20	1.95	2.30	2.20	2.10	2.00	2.00	1.95	1.90	1.85	1.85	1.85	2.00	2.05	2.20	2.30	2.45	2.60	2.80	2.95
7	3	Glen Park	0.80	0.80	0.80	0.80	0.80	0.80	1.70	2.80	2.60	2.50	2.35	2.15	1.90	2.25	2.15	2.10	2.00	1.95	1.90	1.85	1.80	1.80	1.80	1.95	2.05	2.15	2.30	2.40	2.55	2.75	2.95
10	6	4	24th St. Mission	0.80	0.80	0.80	0.80	0.80	1.55	2.70	2.50	2.45	2.30	2.10	1.85	2.20	2.10	2.00	1.90	1.90	1.85	1.75	1.65	1.65	1.65	1.85	1.95	2.10	2.20	2.35	2.50	2.70	2.85
13	8	6	3	16th St. Mission	0.80	0.80	0.80	0.80	1.55	2.70	2.50	2.45	2.25	2.10	1.80	2.15	2.05	2.00	1.90	1.85	1.80	1.70	1.60	1.60	1.60	1.80	1.95	2.10	2.20	2.30	2.45	2.70	2.85
15	11	9	5	3	Civic Center	0.80	0.80	0.80	1.40	2.65	2.45	2.40	2.25	2.05	1.75	2.10	2.00	1.95	1.85	1.80	1.75	1.60	1.55	1.55	1.55	1.75	1.90	2.05	2.15	2.30	2.40	2.65	2.80
17	13	10	7	5	2	Powell	0.80	0.80	1.40	2.65	2.45	2.40	2.25	2.05	1.75	2.10	2.00	1.95	1.85	1.80	1.75	1.60	1.55	1.55	1.55	1.75	1.90	2.05	2.15	2.30	2.40	2.65	2.80
19	15	12	9	7	4	2	Montgomery	0.80	1.40	2.65	2.45	2.40	2.25	2.05	1.75	2.10	2.00	1.95	1.85	1.80	1.75	1.60	1.55	1.55	1.55	1.75	1.90	2.05	2.15	2.30	2.40	2.65	2.80
21	16	14	11	8	6	4	2	Embarcadero	1.40	2.65	2.45	2.40	2.25	2.05	1.75	2.10	2.00	1.95	1.85	1.80	1.75	1.60	1.55	1.55	1.55	1.75	1.90	2.05	2.15	2.30	2.40	2.65	2.80
28	24	21	18	16	13	11	10	8	West Oakland	1.90	1.70	1.65	1.45	1.15	0.80	1.35	1.20	1.10	0.95	0.85	0.80	0.80	0.80	0.80	0.80	0.80	0.95	1.15	1.35	1.50	1.65	1.90	2.05
68	63	61	57	55	53	51	49	47	40	Concord	0.80	0.80	0.80	0.80	1.75	2.10	2.00	1.95	1.85	1.85	1.80	1.80	1.85	1.85	1.85	1.90	2.00	2.15	2.25	2.35	2.50	2.75	2.90
62	57	54	51	49	46	45	43	41	34	7	Pleasant Hill	0.80	0.80	0.80	1.55	1.95	1.85	1.75	1.65	1.65	1.60	1.60	1.65	1.65	1.65	1.70	1.80	1.95	2.05	2.20	2.30	2.55	2.70
58	54	51	48	46	43	41	40	38	30	10	4	Walnut Creek	0.80	0.80	1.40	1.85	1.75	1.70	1.60	1.55	1.55	1.55	1.55	1.55	1.55	1.65	1.75	1.85	2.00	2.10	2.25	2.45	2.65
53	49	46	43	41	38	36	35	33	25	15	9	6	Lafayette	0.80	1.15	1.70	1.60	1.50	1.45	1.40	1.30	1.25	1.35	1.35	1.35	1.50	1.55	1.70	1.80	1.95	2.10	2.30	2.45
48	43	41	37	35	33	31	29	27	20	21	14	11	6	Orinda	0.80	1.50	1.40	1.30	1.15	1.10	1.00	0.80	1.05	1.05	1.05	1.20	1.40	1.55	1.65	1.75	1.90	2.15	2.30
41	37	34	31	29	26	25	23	21	14	27	21	17	12	7	Rockridge	1.20	1.05	0.90	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.85	1.00	1.20	1.40	1.55	1.65	1.90	2.05
59	55	52	48	46	43	41	40	38	30	51	45	42	37	31	25	Richmond	0.80	0.80	0.80	0.80	0.80	1.20	1.30	1.30	1.30	1.45	1.55	1.65	1.80	1.90	2.05	2.30	2.45
55	50	47	44	42	39	37	35	34	26	47	41	38	33	27	21	5	El Cerrito Del Norte	0.80	0.80	0.80	0.80	1.00	1.10	1.10	1.10	1.35	1.45	1.60	1.70	1.80	1.95	2.20	2.35
51	47	44	41	38	36	34	32	30	23	44	38	35	30	24	18	8	4	El Cerrito Plaza	0.80	0.80	0.80	0.90	1.00	1.00	1.00	1.20	1.35	1.50	1.60	1.75	1.90	2.10	2.25
48	43	40	37	35	32	30	28	27	19	40	34	31	26	20	14	12	7	4	North Berkeley	0.80	0.80	0.80	0.80	0.80	0.80	1.05	1.20	1.40	1.50	1.65	1.80	2.00	2.15
45	40	38	34	32	29	27	26	24	16	37	31	28	23	17	11	15	10	7	3	Berkeley	0.80	0.80	0.80	0.80	0.80	1.00	1.15	1.35	1.50	1.65	1.75	2.00	2.15
42	38	35	31	29	26	25	23	21	13	34	28	25	20	14	8	17	13	10	6	3	Ashby	0.80	0.80	0.80	0.80	0.90	1.05	1.30	1.45	1.60	1.75	1.95	2.10
38	34	31	28	26	23	21	19	18	10	30	24	21	16	10	4	21	17	14	10	7	4	MacArthur	0.80	0.80	0.80	0.80	0.95	1.20	1.35	1.55	1.65	1.90	2.05
34	30	27	24	22	19	17	16	14	7	34	28	25	20	14	8	25	20	17	13	11	8	4	19th St. Oakland	0.80	0.80	0.80	0.80	1.10	1.25	1.50	1.60	1.85	2.00
32	28	26	22	20	18	16	14	12	5	36	29	26	21	16	9	26	22	19	15	12	10	6	2	Oak. City Ctr. 12th St.	0.80	0.80	0.80	1.10	1.25	1.50	1.60	1.85	2.00
33	29	26	23	21	18	16	15	13	5	39	33	30	25	19	12	30	25	22	18	16	13	9	6	4	Lake Merritt	0.80	0.80	1.10	1.25	1.50	1.60	1.85	2.00
38	34	31	28	26	23	21	19	18	10	43	37	34	29	23	17	34	30	26	23	20	17	13	10	8	5	Fruitvale	0.80	0.80	1.05	1.25	1.50	1.70	1.90
42	37	35	31	29	27	25	23	21	14	47	41	38	33	27	20	37	33	30	26	23	20	17	13	11	8	4	Coliseum	0.80	0.80	1.10	1.35	1.65	1.80
46	41	39	35	33	31	29	27	25	18	51	45	42	37	31	24	42	37	34	30	28	25	21	17	16	12	8	5	San Leandro	0.80	0.80	1.10	1.45	1.65
50	45	43	40	37	35	33	31	30	22	55	49	46	41	35	29	46	41	36	34	32	29	25	21	20	16	12	9	5	Bay Fair	0.80	0.80	0.80	0.80
55	50	47	44	42	40	38	36	34	27	59	53	50	45	39	33	50	46	42	39	36	33	29	26	24	21	16	13	9	5	Hayward	0.80	0.80	0.80
59	54	52	48	46	44	42	40	38	31	63	57	54	49	44	38	54	50	47	43	40	37	33	30	29	25	21	17	13	9	5	South Hayward	0.80	0.80
64	59	57	54	52	49	47	46	44	36	69	63	60	55	49	43	60	55	52	48	45	43	39	35	34	30	26	23	18	14	10	6	Union City	0.80
69	65	62	59	56	54	52	50	49	41	74	68	65	60	54	48	64	60	57	53	50	47	44	40	38	35	31	27	23	19	15	11	5	Fremont

Time

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(Continued from inside front cover)

BART FACTS
FISCAL YEAR 1987/1988 DATA
(JULY 1987 - JUNE 1988)

FARES

Regular Adult: Rail fares are largely based on a distance formula ranging from 80¢ to $3.00. The average weekday rail fare is currently $1.70. Regular express bus fares are 75¢ and $1.15 for one and two zone rides, respectively; rail patrons transferring to an express bus may obtain a free transfer worth 75¢.

Discounts: A maximum 6.25% rail fare discount is provided through the sale of $32 tickets for $30. Rail fares for handicapped persons, students 5-12 years of age, and persons 65 years of age and older are 10% of the regular adult fares. Children under 5 can ride free. Other discounts are provided through specially priced passes and/or ticket books for travel on BART express buses, San Francisco MUNI, and AC Transit.

Transfers: Free transfers can be made between all BART trains. Special agreements between BART and most other Bay Area operators permit up to a 50% discount for connecting transit service (on a round-trip basis).

PATRONAGE

Average Weekday: BART patronage averaged 198,259 trips per weekday during FY 1987/88. Of these trips, 97,945 (49.4%) occurred within the 4-hour peak travel period (2 morning hours plus 2 afternoon hours). Transbay trips constitute 49.2% of weekday travel with 23.9% Eastbay and 26.9% Westbay.

Weekends: Saturday ridership averaged 81,881 trips with 45.5% Transbay, 29.6% Eastbay, and 24.9% Westbay. Ridership for Sunday averaged 48,093 with market shares of 45.7% Transbay, 31.8% Eastbay, and 22.5% Westbay.

Total Ridership: Rail ridership totaled 57,595,481 trips during FY 1987/88, 1.3% below a forecast of 58,369,400.

CAPACITY

On-Line Requirements: BART currently operates a maximum of 45 on-line trains which require 90 A-cars, 248 B-cars, and 8 C-cars. In addition to these, 8 trains are held as ready spares requiring 16 A-cars and 24 B-cars.

Maximum Service Delivery: As of June 1988, scheduled peak hour capacity for the three Transbay routes serving downtown San Francisco and Oakland stations is 17 trains consisting of 158 cars (or 11,376 seats). For the Eastbay route, which also serves downtown Oakland stations, maximum peak hour capacity is 5 trains consisting of 24 cars (or 1,728 seats).

KEY PERFORMANCE INDICATORS

Train On-Time Performance: Daily on-time performance has consistently been above 90% since October 1980 and averaged 95.9% during FY 1987/88.

Scheduled Train Dispatches Completed: Performance has consistently been above 98% since January 1981 and averaged 98.9% during FY 1987/88.

Load Factors: Peak hour load factors during FY 1987/88 averaged 1.23 for Transbay service and 1.07 for the Eastbay route. Load factors for the shoulder period (approximately 45 minutes before and after the peak hour) averaged 1.14 Transbay and 0.93 for the Eastbay route. Maximum average load factors for offpeak service is 0.72 systemwide.

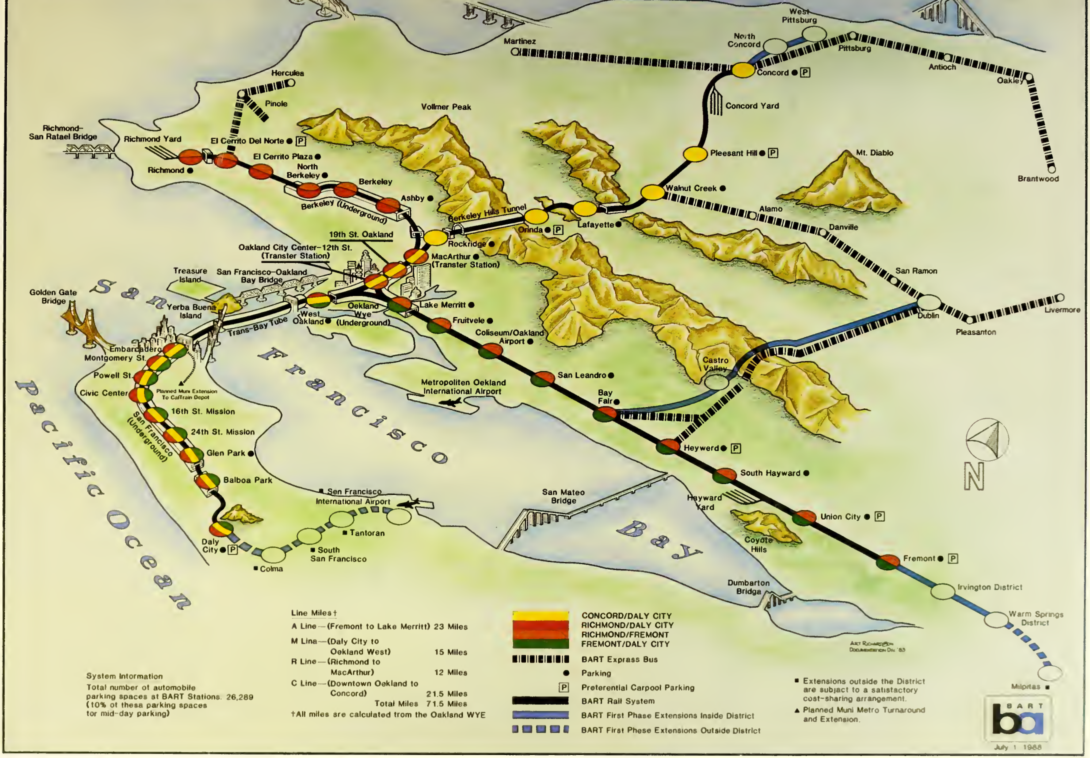
Peak Period Transbay Throughput: The percentage of scheduled Transbay capacity actually provided during FY 1987/88 is 97.4% for trains and 97.1% for cars.

OTHER PERFORMANCE DATA FOR FY 1987/88

PERFORMANCE DATA (1,000's)	
Total passengers	57,595.5
Passenger-miles	722,583.1
Car-miles	31,393.1
Car-hours	1,148.1
Rail operating cost	$152,008.6
Express bus cost	$8,455.1
Transfer/Shuttle bus cost	$7,311.0
Total operating cost	$167,774.7
Net passenger revenue	$78,474.4
Other revenue	$5,648.5
Total revenue	$84,122.9
Operating deficit	$83,651.8

PERFORMANCE INDICATORS	
Farebox ratio	46.77%
Operating ratio	50.14%
Passenger-miles/seat-mile	31.97%
Rail operating cost/passenger-mile	21.04¢
Rail operating cost/passenger	$2.64
Total operating cost/passenger	$2.91
Total operating revenue/passenger	$1.46
Total operating deficit/passenger	$1.45
Rail operating cost/car-hour	$132.40
Rail operating cost/car-mile	$4.84
Passenger-miles/car-hour	629.37
Passenger trips/car-mile	1.83

BART SYSTEM MAP



System Information
Total number of automobile parking spaces at BART Stations: 26,289 (10% of thesa parking spaces tor mid-day parking)

Line Miles†

A Line—(Fremont to Lake Merritt)	23 Miles
M Lina—(Daly City to Oekland West)	15 Miles
R Line—(Richmond to MacArthur)	12 Miles
C Line—(Downtown Oekland to Concord)	21.5 Miles
Total Miles	71.5 Miles

†All miles are calculated trom the Oakland WYE

🟨	CONCORD/DALY CITY
🟥	RICHMOND/DALY CITY
🟧	RICHMOND/FREMONT
🟩	FREMONT/DALY CITY
▮▮▮▮▮	BART Express Bus
●	Parking
P	Preterential Carpool Parking
▬	BART Rail System
▬	BART First Phase Extensions Inside District
■ ■ ■ ■	BART First Phese Extensions Outside District

■ Extensions outside the District are subject to a satistactory cost-sharing arrangement.
▲ Planned Muni Metro Turnaround and Extension.

BART

BAY AREA RAPID TRANSIT DISTRICT

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1989 FIVE YEAR PLAN

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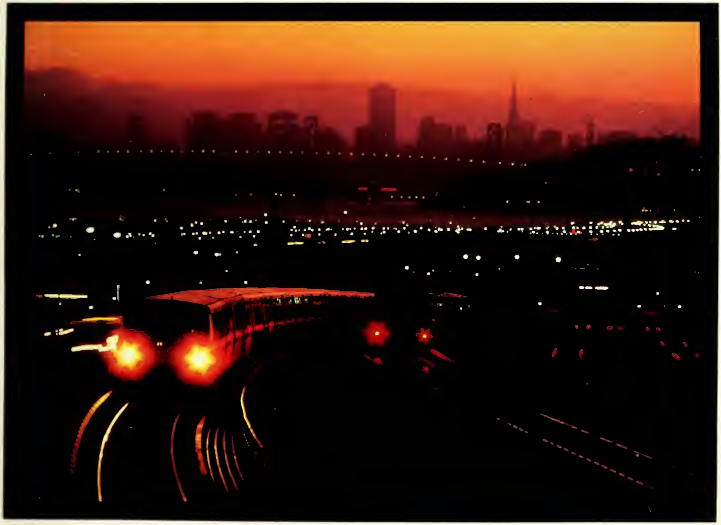

SEPTEMBER 1989

BART FACTS
FISCAL YEAR 1988/1989 DATA
(JULY 1988 - JUNE 1989)

FIXED FACILITIES

Mainline Track: Revenue service is provided over 71.5 miles of double mainline 66 inch guage track, of which approximately 20 miles are in subway, 24 elevated, and 27 at grade.

Stations: There are 34 stations including 14 in subway, 13 elevated, and 7 at grade. Average station spacing is between 1/2 to 1 mile within and adjacent to San Francisco, Oakland, and Berkeley downtown areas, and 2 to 4 miles apart in suburban areas. Automatic fare collection equipment is located in each station to vend and process patron tickets. As of June 1989, BART provides 26,592 free paved parking spaces at 23 stations and 200 paved spaces at one additional station at a daily charge of 25¢ per space.

Maintenance Facilities: Equipment maintenance is performed at three Eastbay yards located in Hayward, Concord, and Richmond. A special track geometric vehicle is used to analyze the running rails and electrical third rail. Maintenance of right-of-way is routinely performed during off-revenue hours.

Administrative/Central Control Center: Trains are automatically controlled by wayside equipment and supervised by the central computer at BART headquarters located above the Lake Merritt Station in Oakland. Operators on board the leading car of each train have full voice communication with central control personnel and passengers on board, and can override automatic controls should the need arise.

ROLLING STOCK

Fleet Inventory: BART owns three types of revenue vehicles. Control equipped A-cars contain 72 seats, are 75 feet long by 10.5 feet wide, and can only be used as a lead or trail vehicle on each train. Non-control equipped B-cars also contain 72 seats, are 70 feet by 10.5 feet, and can only be used as a mid-train vehicle. Control equipped C-cars contain 64 seats, are 70 feet by 10.5 feet, and can be used as a lead, mid-train, or trail vehicle. As of June 1989, BART owns 137 A-cars, 303 B-cars, and 90 C-cars. All of these vehicles are in the operating fleet except for two A-cars and two B-cars. One A-car is retained as an engineering test vehicle, one A-car and one B-car were removed due to accident damage, and one B-car is in long-term storage.

Trains: Train lengths range from 3 to 10 cars. Corresponding seating capacity is between 192 and 720 passengers. Scheduled top speed is 70 mph with a systemwide average of 33 mph, including station stops. Trains stop at each station along a designated route.

SERVICE HOURS

Rail: Rail service is provided between the hours of 5 am and 1:30 am Monday through Friday, 6 am to 1:30 am on Saturdays, and 9 am to 1:30 am on Sundays and major holidays. Closings for individual stations are timed with the schedule for the last train beginning at approximately midnight. Service frequencies (in minutes) for individual routes and line segments are as follows:

	TRANSBAY ROUTES			EASTBAY	CBD LINE SEGMENT	
	Concord-Daly City	Fremont-Daly City	Richmond-Daly City	Richmond-Fremont	San Francisco	Downtown Oakland
WEEKDAY						
Peak Hour	7.5	11	15	15	3.8**	3.8
Midday	15	15	15	15	5	5
Night	20	*	*	20	20	10
SATURDAY						
Daytime	20	20	20	20	6.7	6.7
Night	20	*	*	20	20	10
SUNDAY/HOLIDAY						
All Day	20	*	*	20	20	10

*Requires transfer between Concord/Daly City and Richmond/Fremont routes.
**3.0 minute headway service is operated during peak 15 minutes.

Express Bus: The District also provides express bus service within major travel corridors not served by rail in both Alameda and Contra Costa counties in the Eastbay. Bus service frequencies (in minutes) are as follows:

	Eastern Contra Costa	Western Contra Costa	Central Contra Costa-Alameda	Eastern Alameda
WEEKDAY				
Peak Hour	15	30	30	30
Midday	30	30	30	30
Night	60	40	60	60
SATURDAY				
Daytime	60	40	45	30
Night	60	40	60	60
SUNDAY/HOLIDAY				
All day	60	*	60	60

*No service during this time period.

(Continued on inside back cover)

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

1989 FIVE YEAR PLAN

INTERIM UPDATE

The preparation of this report has been financed in part through a grant from the United States Department of Transportation, Urban Mass Transportation Administration under the Urban Mass Transportation Act of 1964, as amended, as passed through the Metropolitan Transportation Commission.

The contents of this report reflect the views of BART, which is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the original views or policy of the U.S. Department of Transportation. This report does not constitute a standard, specification, or regulation.

September 1989

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

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7TH DISTRICT

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8TH DISTRICT

MICHAEL BERNICK
9TH DISTRICT

August 23, 1989

TO BART PATRONS AND BAY AREA RESIDENTS:

The decade of the '80s has been witness to BART establishing a solid performance record, implementing projects needed for added capacity, and progressing towards realizing extensions of the system. The 1989 editions of the Five Year Plan and Capital Improvement Program cap a decade of achievements and chart a course of action for realizing additional progress well into the 1990s.

With the completion of the Daly City Turnback and Yard later this year and well over one-half of the new C-cars already delivered, BART is putting the final touches in place which will allow for the addition of more service. Peak period train frequency and capacity will be increased over a four-year period beginning this coming year with the addition of three new transbay trains. By September 1993 BART will provide service with 33% more cars to form 29% more trains which will operate at a peak frequency 53% higher than today. Supporting this will be improved access to stations, including better feeder bus service and more than 10,600 new parking spaces.

With construction for Capacity Expansion Program projects winding down and new service coming on line, BART will be entering a new era for extensions. The groundwork completed over the past decade, including resolution of key issues and a tax-supported local commitment to build, has pumped new life into realizing first phase extensions to Dublin, Warm Springs, West Pittsburg, and San Francisco International Airport. BART extensions are the next great challenge.

Framing this challenge is the overriding concern for continuing to provide safe, efficient, and economical transportation on a day-to-day basis for BART's growing ridership. This effort is guided by BART's goals and objectives which have been developed as part of the Five Year Plan. These policy statements effectively channel our efforts, enabling BART to deliver the best service possible. Figures 4 and 5, on pages 6 and 7, summarize this policy. These include new and ongoing projects and programs, as well as standards for operating performance. The financial plan required for implementing the programmed service improvements is presented in Figure 23 on page 50.

Frank J. Wilson
General Manager

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LIST OF ACRONYMS

AC TRANSIT: Alameda-Contra Costa Transit

AFC: Automatic Fare Collection

BART: Bay Area Rapid Transit

CCCTA: Central Contra Costa Transit Authority

CIP: Capital Improvement Program

CPI: Consumer Price Index

CPUC: California Public Utilities Commission

MTC: Metropolitan Transportation Commission

RTA: Regional Transit Authority

SAMTRANS: San Mateo County Transit

SF MUNI or **MUNI:** San Francisco Municipal Railway

SSD: Special Service District

STA: State Transit Assistance

TDA: Transportation Development Act

UMTA: Urban Mass Transportation Administration

INTRODUCTION:

ELEMENTS OF ACTION

The past year has witnessed a renewed awareness on the part of BART for serving its customers -- the traveling public -- better. The principles and programs presented in BART's 1988 Five Year Plan, entitled A Plan For Progress, laid the foundation for cultivating greater customer consciousness and sensitivity on the part of all BART employees with respect to current riders' experiences with the system and what's needed to attract new riders.

This document, BART's 1989 Five Year Plan Interim Update, carries forth the principles and programs identified last year. The focus here is what's new relative to the 1988 Five Year Plan. Attention is given to key events which have occurred generally from January 1988 to the present that have directly affected how many people ride BART, the quality and capacity of service delivered, the system's productivity and efficiency, and overall financial performance.

The program objectives and performance indicators which were adopted for FY 1988/89 serve as the starting point for evaluating BART's progress. The status for these policy elements is summarized in Figures 1 and 2. This evaluation, along with issues that have emerged within the past year and other new information, constitute the underlying bases for revising BART's policy framework. As part of the annual planning and budget cycle, BART's goals, program objectives, and performance indicators undergo extensive review by all departments, the General Manager, and the Board of Directors (Figure 3). This review, and a follow-up opportunity for public comment, yield the updated policy (Figures 4 and 5) which directs and guides the organization toward continued progress. This means succeeding in realizing greater demand for BART service, providing better and more service, improving productivity and efficiency, and providing adequate financial support to carry out the Plan.

The 1989 Five Year Plan Interim Update is meant to be a stand-alone document. The chapter headings, which derive from the policy framework, have been retained from the 1988 Plan. For historical or background information (ie: events prior to January 1988), the reader should consult respective chapters contained in the 1988 Five Year Plan. The reader should also be aware that BART's Capital Improvement Program, a companion to the Five Year Plan, is also available in a separately bound 1989 edition and is the single most important source of information for BART's five year capital program. Copies of BART's 1988 Five Year Plan, the 1989 Capital Improvement Program, and additional copies of this 1989 Five Year Plan Interim Update may be obtained by request through BART's Office of Research.

Figure 1

STATUS FOR FY 1988/89 PERFORMANCE INDICATORS

PERFORMANCE INDICATORS	JULY-DECEMBER 1988			FY 88/89 YEAR-END STANDARD
	ACTUAL	STANDARD	STATUS[a]	
1. Ridership: Total Trips	29,947,106	29,511,610	EXCEEDED	59,369,780
Average Weekday Trips	204,394	201,612	EXCEEDED	203,649
2. 4 AM Car Availability (%): A-Cars	73.4	85.0	NOT MET	85.0
B-Cars	85.3	90.0	NOT MET	90.0
C-Cars	43.0	85.0	NOT MET	85.0
3. Peak 5-Minute Delays (Per 100 Train Runs): Delay Events	3.49	3.00	NOT MET	3.00
Delayed Trains	9.69	8.00	NOT MET	8.00
4. Peak Period/Peak Direction Transbay Car Throughput (%)	97.2	97.5	MET	97.5
5. Load Factors: Peak (Discretionary Trains Only)	1.06	1.00	(b)	1.00
Offpeak (All Midday And Night Trains)	0.74	1.00	(c)	1.00
6. Patron Trip On-Time Performance (%): Daily	94.8	94.0	EXCEEDED	94.0
Peak	93.7	(d)	MET	(d)
7. Patron Accidents (Annual Rate---Incidents/Million Trips)	13.7	17.7	EXCEEDED	17.7
8. AFC Performance (Incidents/1,000 Car Hours)	0.30	0.30	MET	0.30
9. Station Equipment Availability (%): Elevators	99.5	96.0	EXCEEDED	96.0
Escalators	96.5	96.0	EXCEEDED	96.0
10. Express Bus On-Time Performance (%)	97.0	95.0	EXCEEDED	95.0
11. Farebox Ratios (%): Rail	54.0	51.2	EXCEEDED	50.5
Express Bus	9.5	10.1	NOT MET	10.6
Total Operation	49.4	47.1	EXCEEDED	46.7
12. System Operating Ratio (%)	52.8	50.3	EXCEEDED	49.8
13. Rail Cost Per Passenger Mile (¢)	20.3	21.1	EXCEEDED	21.4
14. Vehicle Miles Per Equivalent BART Employee	17,807	15,754	EXCEEDED	15,754
15. System Utilization (%--Passenger Miles/Seat Mile)	32.0	33.1	NOT MET	32.5
16. Employee Lost Time Due to Industrial Injuries (%)	1.43	0.50	NOT MET	0.50
17. Paid Sick Leave (%--Sick Hours Paid/Straight Time Hours Paid)	3.78	3.50	NOT MET	3.50
18. DBE Participation (%): All Contracts	21.5	21.0	EXCEEDED	21.0
Federally Assisted Contracts	9.1	21.0	NOT MET	21.0

a. Standards are judged to be met if the ratio of actual to desired performance is within 0.5% of standards, where a maximum value is desired. The reciprocal of this calculation is taken where a minimum value is the desired standard.

b. Delays in the delivery of C-cars coupled with the inverter problem have impacted the lengthening of peak period discretionary trains which was planned to achieve the current load factor objective for peak period operations. Because of this, train sizing was performed on the basis of balancing peak period load factors across all four routes.

c. Offpeak load factors are for weekday trains only and represent the average of the highest loading for each midday and night train. During the period July-December 1988, this objective was achieved for 52 of the 53 offpeak trains which operate on weekdays.

d. There is no specified standard for peak period patron on-time performance. However, BART Board policy calls for the reporting of actual performance quarterly.

Figure 2

STATUS FOR FY 1988/89 PROGRAM OBJECTIVES

PROGRAM OBJECTIVE	STATUS AND HIGHLIGHTS FOR THE PERIOD JULY - DECEMBER 1988
CAPACITY & RELIABILITY	
1. Continue to implement the Capacity Expansion Program such that the completion of the Daly City Turnback and other required projects will allow for the April 1989 startup of 48-train service at a minimum scheduled headway of 3 minutes 10 seconds.	The start of 3 minute 10 second service is slated to begin in November 1989. Given the required number of vehicles to form additional trains, this is in accordance with the anticipated C-car delivery and availability.
SAFETY	
2. Conduct a minimum of one emergency plan exercise per month involving response agencies.	Sixteen emergency procedures and training drills were conducted in the July - December 1988 period. Eleven of these involved smoke movement exercises within underground sections of the system. The remaining five drills focused on BART vehicle and station familiarization.
3. Develop a comprehensive mitigation plan addressing BART industrial injuries.	A tracking system for this project was completed. The entire project is 45% complete.
ACCESS	
4. Provide 499 additional BART-owned paved parking spaces at existing rail stations by June 1989.	In September, BART opened 140 new parking spaces at North Berkeley Station and 54 spaces at El Cerrito Plaza Station. The Pleasant Hill Station parking project, which called for the addition of 193 spaces, is to be rebid for construction in March 1989. The removal of curbside red zones at Pleasant Hill Station in October, 1988 resulted in the addition of 100 new parking spaces (these are unmarked spaces along the station access roadway).
5. Make available a combined BART express bus/rail ticket by June 1989.	The combined BART express bus/rail ticket is now being developed as part of the first phase of the Universal Ticket project which was funded in September 1988. The current schedule calls for a combined stored value bus/rail ticket to be available by mid-1990 for use on BART express buses and buses operated by CCCTA. As of the end of December, specifications for the bus ticket validators were completed and incorporated into an RFP which was mailed by CCCTA on December 23, 1988. Responses to this RFP were due by February 28, 1989.
6. Complete all elevator conversions by June 1989.	Installation work at 29 of the system's 34 stations is substantially complete. Punch list and force account work is proceeding.
HUMAN RESOURCES	
7. Implement a Districtwide customer service philosophy and assure that departmental objectives and management practices support it.	Implementation of a pilot program focusing on customer service has been delayed as the result of labor contract negotiations follow-up activities. The pilot program is in place for 4 of 5 units with the 5th to be installed in January 1989. Evaluation of the pilot program is to continue into the January-March 1989 quarter.
8. Work to achieve the objectives called for in the Affirmative Action Plan and report performance quarterly.	Significant progress toward achieving affirmative action targets was not made as the result of limited job opportunities during the first half of FY 1988/89. A detailed report will be presented to the Administration Committee in April 1989.
MARKETING	
9. Complete Regional Transit Information Centers at 12 BART stations by June 30, 1989.	This project is on schedule and is expected to be completed in June 1989.

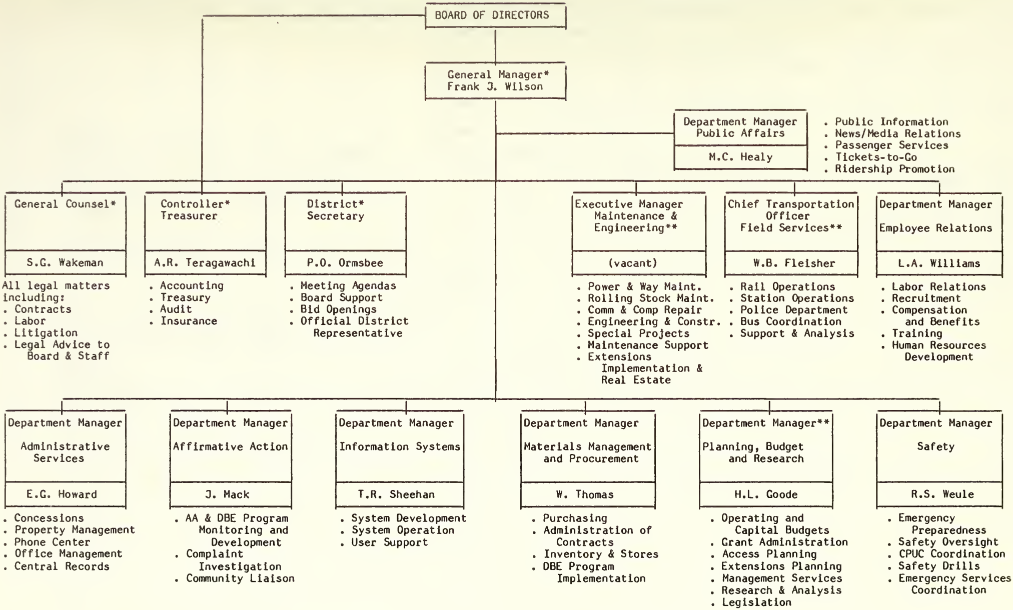
Figure 2 (Continued)

STATUS FOR FY 1988/89 PROGRAM OBJECTIVES

PROGRAM OBJECTIVE	STATUS AND HIGHLIGHTS FOR THE PERIOD JULY - DECEMBER 1988
10. Complete key research projects to provide basis for updated marketing strategies.	Contract negotiations were initiated in December 1988 with the consultant selected to perform key tasks for achieving this objective.
11. Review existing service patterns and develop new or improved service options for implementation during FY 88/89.	A review of existing service was conducted by a multi-departmental task force for the purpose of identifying options which may result in improved service, increased ridership, and favorable financial ratios. Evaluation of service options is to continue. Currently in process is a re-evaluation of the financial analysis in response to revised power costs from PG&E.
12. Reach and maintain 150 offsite ticket outlets at banks and retail establishments available to the general public, in addition to employer distribution program, with adequate coverage throughout the District.	BART currently has 135 retail and bank ticket outlets. In addition to these outlets which are available to the general public, there are 128 ticket outlets associated with employers, schools, and social service organizations.
JOINT DEVELOPMENT	
13. Complete station plans for Rockridge, Hayward, El Cerrito del Norte, and Bay Fair by June 1989.	Station plans for Hayward, El Cerrito del Norte, and Bay Fair were completed. These plans are expected to be presented for Board approval this coming Spring. Completion of the station plan for Rockridge is dependent on further Board action in conjunction with a neighborhood survey.
14. Execute a minimum of one ground lease by June 1989 in concert with ongoing joint development marketing efforts.	No lease negotiations are underway. Current real estate market conditions make the achievement of this objective unlikely. It appears that the best opportunity for accomplishing this objective is with respect to Rockridge Station. Further action for Rockridge is pending the outcome of a neighborhood survey (see #13, above).
15. Work to achieve not less than 15% equity participation in District Joint Development Projects by women and minority individuals and/or disadvantaged business enterprises.	(See #14 above.)
EXTENSIONS	
16. Complete the Alternatives Analysis/Draft Environmental Impact Statement/Final Environmental Impact Reports and Locally Preferred Alternative Reports for both Pittsburg-Antioch and Fremont-South Bay Corridors.	The Pittsburg-Antioch Alternatives Analysis/Final Environmental Impact Report was completed in November 1988. The BART Board has withdrawn the full BART-to-San Jose/Santa Clara alternative from the UMTA-sponsored Fremont-South Bay Corridor Study for the purpose of proceeding with a state Environmental Impact Reprot (EIR) on the Warm Springs Extention. Completion of the Warm Springs Extension EIR is expected by January 1990.
17. Complete the Dublin/Pleasanton Extension Draft Environmental Impact Report.	The environmental analysis for this project was initiated in October 1988.
18. Complete the advance acquisition of at least three extension land sites.	A 53.91 acre site was acquired for $5.1 million in August 23, 1988 for a possible future station at West Livermore.

Figure 3

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT



* Board Appointee
**Project Review Board Member

July 1989

Figure 4: FY 1989/90 BART POLICY FRAMEWORK, GOALS AND PROGRAM OBJECTIVES

GOALS	PROGRAM OBJECTIVES
1. Operate scheduled 4-route weekday service with route headways of 15 minutes or less during peak and midday periods; expand service within technical and financial limits, including improved peak-hour frequency of service and capacity where needed. 2. Improve the reliability and performance of the present BART system. 3. Fund and implement the necessary capital improvements and replacements to the system. 4. Operate within available funds without incurring an unfunded deficit. 5. Continue to improve BART system and patron safety and emergency preparedness. 6. Improve system access by means of a comprehensive program of parking expansion, feeder services, transit coordination, and special projects addressing elderly and handicapped mobility. 7. Develop and maintain a BART workforce that is motivated to provide the best service possible to BART passengers. 8. Make every effort to achieve District objectives for female and minority employment, and disadvantaged and minority business enterprise participation.	**CAPACITY & RELIABILITY** 1. Continue to implement the Capacity Expansion Program and projects which will allow for the startup of 51-train service at a minimum scheduled headway of 3 minutes 10 seconds by November 1989. **SAFETY** 2. Conduct a minimum of one emergency plan exercise per month involving response agencies. 3. Implement the Comprehensive Mitigation Plan addressing BART industrial injuries. **ACCESS** 4. Provide 443 additional BART-owned paved parking spaces at existing rail stations by June 1990. 5. Implement the Universal Ticket Demonstration Project such that prototype testing is completed by June 1990 for the bus ticket validator, credit/debit card equipment, and cubic faregate modifications. 6. Adopt a multi-year master plan for elderly and handicapped facility improvements and begin implementation of feasible items by June 1990. **HUMAN RESOURCES** 7. Implement a Districtwide customer service philosophy and assure that departmental objectives and management practices support it. 8. Work to achieve the objectives called for in the Affirmative Action Plan and report performance semi-annually and DBE/MBE quarterly.
9. Increase system utilization by promoting BART travel for all purposes with special emphasis on offpeak and reverse commute trips. 10. Maximize the contribution to operating costs from passenger revenues, consistent with reasonable fare levels, to achieve a farebox ratio above 50%. 11. Develop station area sites for the realization of increased patronage and revenues, and to enhance the communities BART serves.	**MARKETING** 9. Complete installation of platform train schedule panels at all stations by September 1989. 10. Complete the 1990 Passenger Profile Survey to provide updated marketing information. 11. Through District marketing efforts, attract 1.5% more riders than the budget ridership forecast. 12. Reach and maintain 150 offsite ticket outlets at banks and retail establishments available to the general public, in addition to the employer distribution program, with adequate coverage throughout the District. **CONCESSIONS & PROPERTY MANAGEMENT** 13. Execute a concession permit with Host International by August 1989 for the establishment of gift and sundry shops at five BART stations.
12. Extend BART trunk lines within Bay Area travel corridors where feasible and in support of regional land use policies.	**EXTENSIONS** 14. Complete the Warm Springs Extension Environmental Impact Report by January 1990. 15. Complete the Dublin/Pleasanton Extension Environmental Impact Report and preliminary engineering by January 1990. 16. Obtain initial earmarking of federal funds for the Rail Extension Program by October 1, 1989. 17. Complete preliminary engineering for a Colma Station extension by April 1990. 18. Maintain a schedule for the Pittsburg Extension such that preliminary engineering will be complete by September 1990.

Figure 5

BART POLICY FRAMEWORK
FY 1989/90 PERFORMANCE INDICATORS AND STANDARDS*

SERVICE DEMAND

**1. Achieve ridership projections as follows (in 1,000s):

	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	FY 1989/90
TOTAL TRIPS	15,543	15,543	15,346	15,943	62,375
AVERAGE WEEKDAY	213.2	213.8	213.4	217.3	215.4

SERVICE DELIVERY

2. Make available for revenue service by 4 a.m. 85% of A-cars, 90% of B-cars, and 75% of C-cars (less 20 cars for testing, retrofit, parts, etc.) until the inverter problem is resolved.

3. Provide service such that no more than 3% of peak period trains experience a primary delay exceeding 5 minutes and no more than 8% experience a delay from any cause exceeding 5 minutes.

4. Operate weekday peak period transbay service in the peak direction providing at least 97.5% of scheduled **CAR THROUGHPUT.**

5. Provide capacity where possible such that the maximum average load factor for discretionary trains is 1.15 during peak periods and not more than 1.00 in the offpeak.

6. Conduct operations such that 94.0% of all **PATRON TRIPS** are completed **ON-TIME.** Also report weekday peak period performance.

7. Continue to provide an environment for patron circulation within stations and in trains such that the accident rate does not exceed 17.7 per million passenger trips.

8. Maintain the **AFC INCIDENT RATE** at or below 0.30 incidents per 1,000 passenger trips.

9. Maintain 97.0% availability for elevators and escalators.

10. Maintain express bus on-time performance such that 95.0% of all runs arrive at their final destination within 5 minutes of schedule.

PRODUCTIVITY & EFFICIENCY

11. Achieve a **FAREBOX RATIO no less than 51.9% for **RAIL OPERATIONS,** 11.7% for express bus operations, and 48.0% for systemwide operations.

12. Achieve a **SYSTEM OPERATING RATIO of no less than 51.2%.

13. Achieve a **RAIL COST PER PASSENGER MILE of 21.0¢ or less.

**14. Achieve a level of service output such that 16,240 vehicle miles are produced per equivalent District employee (based on 2,000 hours worked including overtime, and excluding capitalized and reimburseable labor hours).

**15. Improve system utilization (passenger miles per seat mile) to 31.4% through continued monitoring of train capacity to match passenger demand patterns and attracting reverse commuters.

16. Reduce the total annual amount of employee lost time due to industrial injuries as a percent of time worked to 0.50% or less.

17. Maintain a paid sick leave rate of no more than 3.50%.

18. Work to obtain 21% disadvantaged business enterprise participation for all District contracts determined to have DBE opportunities, including 21% DBE participation for all Federally assisted contracts awarded during the year.

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* **KEY INDICATORS** are denoted by bold face capital letters.

** These standards are derived from the adopted FY 1989/90 budget.

CHAPTER ONE:

BART SERVICE DEMAND

- What Recent Events Have Affected Regional Travel?
- What Has BART Ridership Been Like?
- What Has BART Done To Promote Ridership?
- What's The Outlook For BART Ridership?
- What's The Strategy For Achieving The Forecast?

BART's strategy for attracting a greater share of its untapped market is based on tailoring BART service to better fit customer needs. Demand for BART service is sensitive to its convenience, capacity, reliability, fares, and other factors; some of which may be outside BART's direct control. Important, too, is how well performance compares to BART's primary competitor, the automobile.

The following discussion begins by looking at recent events, generally since January 1988, that have had an impact on regional travel. This is followed by a discussion of what BART ridership has been like and what actions were taken to promote greater system use. The final two sections present BART's revised ridership forecast for the current five year timeframe and the strategy for achieving the new demand targets.

WHAT RECENT EVENTS HAVE AFFECTED REGIONAL TRAVEL?

Independent surveys continue to show that Bay Area residents believe transportation to be the region's number one problem. The passage of dedicated transportation improvement tax measures, most recently in Contra Costa County, is evidence of the public's willingness to provide increased local funding for improving the region's infrastructure. Voter approval in November 1988 for increasing tolls on State-operated San Francisco Bay bridges, which began in January 1989, is another key example of the concern for transportation problems and the need for solutions. Continuous attention to the region's transportation system on the part of the local media further reinforces public perceptions and adds to a greater awareness and understanding of the issues.

As for BART's primary competitor, automobile operating costs continued to increase. Higher costs for insurance, maintenance, and repair more than offset gasoline price declines. On the capital side, the purchase price of automobiles continued to rise as did average loan payments in response to upward creeping inflation and interest rates. BART passenger fares, on the other hand, remained at 1986 levels.

Population increases continued to fuel residential and employment development. The largest growth continued to take place in suburban areas. As a result of this, a growing portion of the Bay Area's commute market now extends into the Sacramento and San Joaquin valleys. The region's inability to keep pace with this growing transportation demand has led to a shortfall of highway capacity in key locations. Many of these are served by BART, such as the San Francisco/Oakland transbay corridor and SR-24/Caldecott corridor. Programmed rehabilitation and reconstruction of Bay Area freeways threaten to make matters worse as completion of multi-year projects will require detours and lane closures.

The evolution of a more unified approach for solving the Bay Area's transportation problems, too, has had a direct impact on extending BART. New sources of funding through recently passed local tax initiatives have accelerated the timetables for completing four first-phase extensions by the late 1990s. Successful negotiations conducted between BART and San Mateo County, which is not in the BART District, were integral to working out a financing plan for the possible extension of BART to San Francisco International Airport. This plan also supports the concurrent implementation of extensions in the East Bay.

WHAT HAS BART RIDERSHIP BEEN LIKE?

The relatively flat trend which characterized BART ridership since the January 1986 fare increase appeared to have been broken beginning early in 1988. This is illustrated in Figure 6 which charts total trips and average weekday ridership by quarter for the last five years. These two measures are BART's key performance indicators for service demand.

During the first quarter of 1988, average weekday system use exceeded the 200,000 mark after two years of hovering around 195,000 trips. Analysis of the data reveals most of the gain was the result of greater demand during offpeak periods when the system operates at less than capacity and seats can be provided for all passengers nearly all of the time.

Year-to-year growth rates by quarter are shown in Figure 7. Note the strong upward trend during the period. Total weekday ridership increased at an annual rate of more than 3% for most of 1988, with the fourth quarter reaching 4.7%. Peak riding was generally up more than 2%, ending the year at 3.5%, while offpeak growth generally exceeded 4% and by year end was increasing at a 5.9% rate. BART's attractiveness for offpeak travel is further substantiated by healthy gains for weekend ridership which increased 10.7% for Saturdays and 12.2% for Sundays between the latter parts of 1987 and 1988.

Even though peak period growth was below that for the offpeak, more commute riders continued to push peak period train load factors to the highest level in 2 1/2 years as shown in Figure 8. The rise in ridership and load factors beginning in early 1988 coincided with the introduction into service of the first new C-cars in March. It appears that media coverage of the long-awaited arrival of the C-cars helped to attract new riders to the system, although what specific impact this coverage had cannot be determined.

Through the first half of FY 1988/89, total BART trips amounted to 29,947,106. This is 1.5% above forecast and 4.2% above total system use for the same six-month period in the prior fiscal year. Weekday BART travel for the first half of FY 1988/89 averaged 204,394 trips. This is 1.4% above forecast and represents a 4.0% gain from the same period a year before.

WHAT HAS BART DONE TO PROMOTE RIDERSHIP?

Activities for increasing ridership built on the principle of tailoring the service to better fit customer needs. A solid service record, the appearance of the new C-cars, and a heightened awareness of deteriorating highway travel conditions presented an excellent opportunity to attract new riders. In short, conditions were right for more people to ride BART, either for the first time, more often, or to give the system "another try."

BART's marketing program keyed off these conditions and used major special events as the cornerstones for capturing a greater share of the offpeak travel

Figure 6

ACTUAL AND FORECAST RIDERSHIP

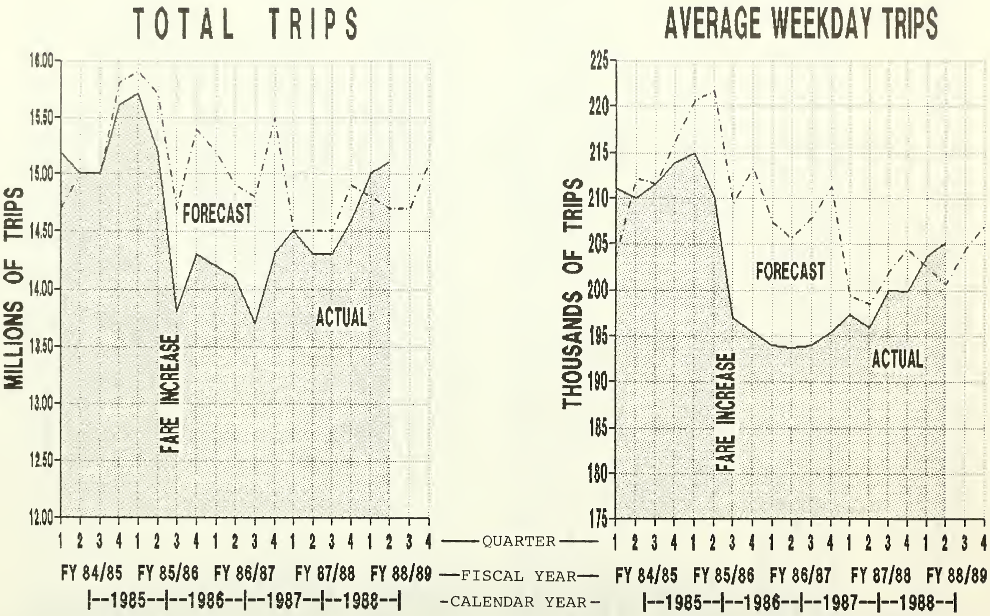


Figure 7

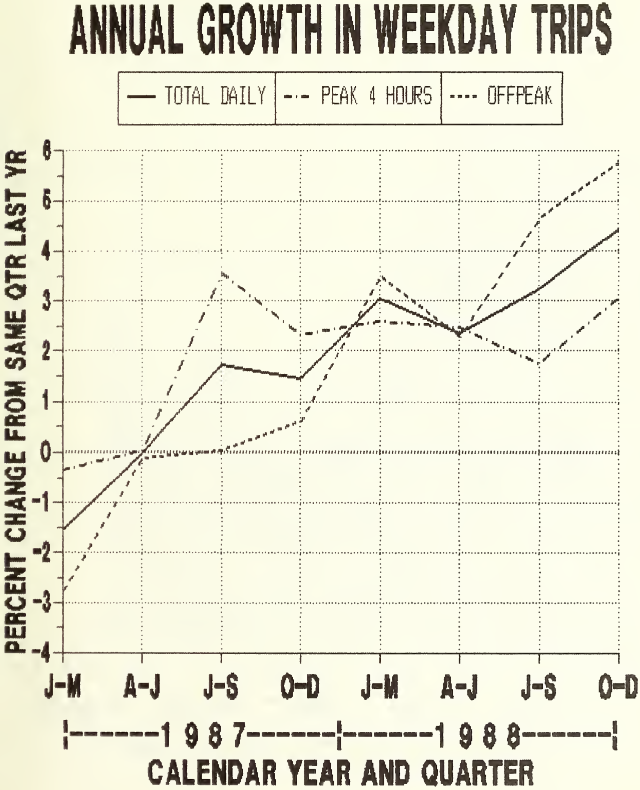
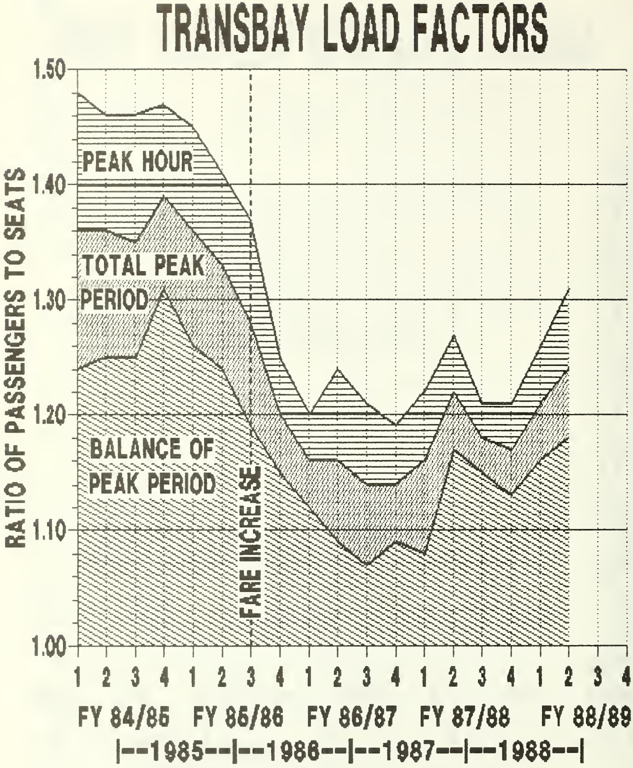

ANNUAL GROWTH IN WEEKDAY TRIPS
TOTAL DAILY
PEAK 4 HOURS
OFFPEAK
PERCENT CHANGE FROM SAME QTR LAST YR
8
6
4
3
2
1
0
-1
-2
-3
-4
J-M
A-J
J-S
O-D
J-M
A-J
J-S
O-D
1 9 8 7
1 9 8 8
CALENDAR YEAR AND QUARTER

Figure 8


TRANSBAY LOAD FACTORS
RATIO OF PASSENGERS TO SEATS
1.50
1.40
1.30
1.20
1.10
1.00
PEAK HOUR
TOTAL PEAK PERIOD
BALANCE OF PEAK PERIOD
FARE INCREASE
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 84/85
FY 85/86
FY 86/87
FY 87/88
FY 88/89
|--1985--|--1986--|--1987--|--1988--|

market. Joint promotional campaigns were conducted with the Oakland A's and other events held at the Coliseum. The winning of the American League pennant by the A's brought the 1988 World Series to BART's door. BART promoted use of the system for travel to the World Series, and it's estimated that one third of all fans attending the three home games at the Coliseum used BART. Other events for which BART aggressively promoted its service and provided additional capacity were the Chinese New Year's Parade, the Bay-to-Breakers footrace, the opening of the new San Francisco Centre, and the holiday shopping season between Thanksgiving and Christmas.

In addition to promoting BART service to individual events, the FY 1988/89 program objectives for marketing guided efforts toward achieving longer-term and sustained ridership gains. The first program objective called for the completion of Regional Transit Information Centers at 12 BART stations by June 1989. This project is progressing and is expected to be in place as planned.

A second program objective is to complete key research projects to provide the basis for updating marketing strategies. Contract negotiations were initiated in December 1988 with the consultant selected to perform key tasks under this objective. Completion, however, has been delayed into next fiscal year.

The third marketing program objective called for the review of existing service patterns and the development of new or improved service options for implementation in FY 1988/89. An evaluation of existing service took place (including a re-evaluation of PG&E power costs) and service options were identified. Implementation of new options, including the originally planned April 1989 start of 3 minute 10 second service, will not take place in FY 1988/89.

The fourth marketing program objective is to expand the number of offsite ticket sales outlets at banks and retail establishments to 150 by June 1989. The number of these outlets which are open to the general public (not including employer distribution, social service centers, and other special outlets) has held fairly steady despite a fluctuating roster of participants. There were 135 offsite outlets throughout BART's service areas as of the end of December 1988, up from 131 outlets a year earlier.

BART's three FY 1988/89 program objectives for access also focused on promoting increased ridership by making the system easier to use. The first access program objective called for the addition of 499 new parking spaces by June 1989. This number of additional spaces was derived from BART's 1988 Capital Improvement Program which identified the completion of parking projects at North Berkeley Station (252 spaces), El Cerrito Plaza Station (140 spaces), and Pleasant Hill Station (193 spaces). The projects for North Berkeley and El Cerrito Plaza have been completed. The need to rebid the contract for Pleasant Hill, however, has resulted in rescheduling the completion of this project into next fiscal year. In light of this delay, an additional 100 new parking spaces were created at Pleasant Hill Station by eliminating curbside "red zones" along the station access roadway.

A second program objective for access focused on the convenience of transfering between BART express buses and trains. The objective called for making a combined BART express bus/rail ticket available by June 1989. The development of this special fare mechanism has been incorporated into the Universal Ticket project which received funding in September 1988. The current schedule calls for a combined stored-value bus/rail ticket to be available by December 1990 for use on BART trains and express buses, as well as buses operated by CCCTA.

The Univeral Ticket will be the third in a series of multi-operator passes and tickets BART has implemented. Joint efforts began with the combined monthly BART/MUNI Fast Pass which was first made available in April 1983. The number of BART customers using the Fast Pass has more than doubled since then, starting out at around 315,000 trips per month in mid-1983 to about 658,000 trips per month for the latter part of 1988. In February 1987, the second joint fare effort culminated with the introduction of the AC/BART Plus Ticket. BART riders using this form of fare payment nearly doubled in one year, from 15,500 total trips in February 1987 to 30,500 for February 1988. One year later, use of this pass grew another 20%, up to 36,400 trips in February 1989.

Another important area of access is use of the system by mobility impaired persons. BART's FY 1988/89 program objective for elderly and handicapped system access called for the completion of elevator conversions by June 1989. As of December 1988, modification to elevators at 29 stations were complete. Units at the remaining 5 stations will be completed well in advance of the June target.

Additional emphasis was given to "delivering the best service possible" under a new BART goal which was adopted for FY 1988/89. With this, efforts turned toward cultivating greater customer consciousness as an effective means of providing a more pleasant experience for BART riders. Satisfied customers are a business's best marketing tool, BART included. Activities with regard to implementing a customer service philosophy were initiated in response to this program objective listed under human resources. A pilot program was developed and put in place by the end of 1988. Evaluation of this pilot program and progress towards developing and implementing the full program are to take place in the second half of FY 1988/89.

WHAT'S THE OUTLOOK FOR BART RIDERSHIP?

In preparing the updated five-year ridership projections, consideration was given to a number of factors. In addition to recent trends in BART patronage, these include:

1. capacity expansion program
2. reliability
3. new service options
4. population and employment growth and distribution
5. highway conditions and reconstruction
6. gasoline prices
7. fare increases

Work is nearing completion on much of the multi-million dollar BART Capacity Expansion Program. As projected completion dates can be estimated more accurately, detailed plans are being formulated for service expansion. These are described more fully in Chapter Two. The planned service expansion is a major factor supporting projected increases in system patronage. As in previous projections, capacity increases are assumed to play a key role in subsequent growth of BART travel, because of reduced crowding and improved frequency of trains. This effect was observed during the previous phase of significant BART capacity expansion (1980-1984).

The recent upward trend in ridership reported in Figure 7 underscores the solid performance record achieved during 1987 and 1988 with respect to system reliability. Maintenance of this level of service is expected throughout the planning period while system capacity expansion is implemented.

Various new service options are being evaluated. Response to such service is not included in the updated five-year projections because this is still being reviewed. However, BART is continually searching for ways to improve the travel options of its clientele. This market oriented focus is the key to continued growth.

Population and employment growth trends were reevaluated for this update of the patronage forecast. Of significance is the resumption of employment growth in the central area served by BART, after recent large increases in suburban employment.

Continuing deterioration of peak period freeway operating performance is anticipated during the planning period. This is expected to make BART relatively more attractive for significant numbers of freeway commuters. Planned freeway reconstruction projects will contribute to this trend during the lengthy construction period.

Gasoline prices are not expected to fall any further during the next five years. No clear cut relationship between gasoline price changes and BART patronage levels has emerged to date. In any case, gasoline and oil represent a steadily decreasing component of auto operating cost. The growing difficulty and expense of parking near work and expected to reinforce recent upward trends in BART patronage.

Changes in BART fare levels are likely to cause relatively minor changes in riding patterns, if such fare changes approximate changes in the cost of living. Accordingly, annual fare increases are assumed to occur in the last three years of the five year financial plan (Chapter Four) to counter inflationary trends and to balance each fiscal year's budget. The assumed fare increases are substantially smaller than BART's last fare revision, which raised fares by an average of 30% as of January 1986. If required, the current assumption would raise fares in July of 1991, 1992, and 1993 by 5%, 3%, and 5%, respectively. These increases may be necessary if no new funding sources are provided for transit, and the historical pattern continues whereby expenses increase faster than sources.

The updated ridership projections are presented in figure 9. Both total annual and average weekday estimates are shown. These include the effect of the budget balancing fare increases discussed above. The growth rates contained in the forecast are summarized in Figure 10, before and after the

Figure 9

RIDERSHIP FORECAST
Includes Impact of Assumed Fare Increases
5% in July 1991, 3% in July 1992, 5% in July 1993

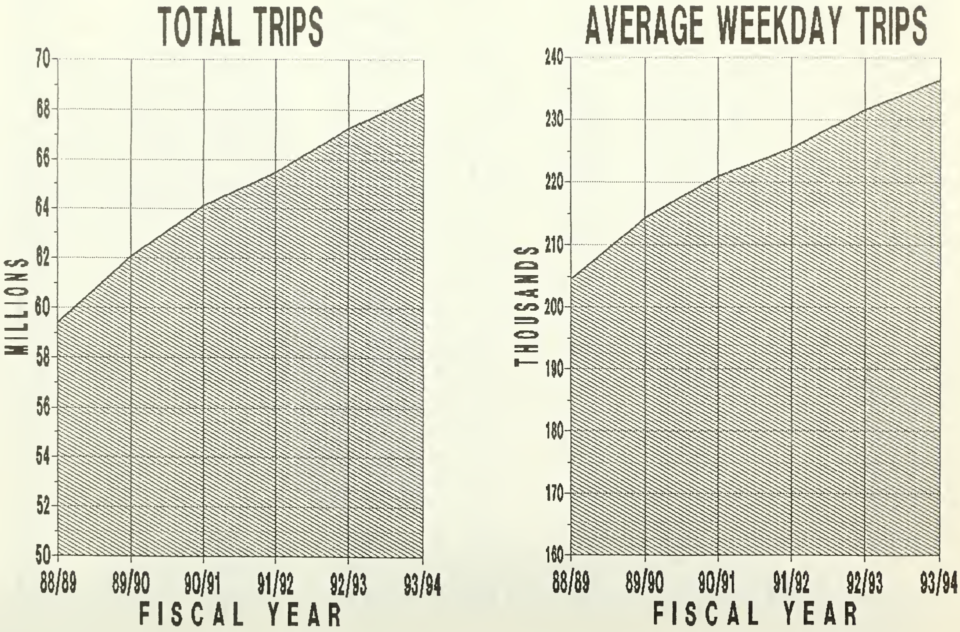
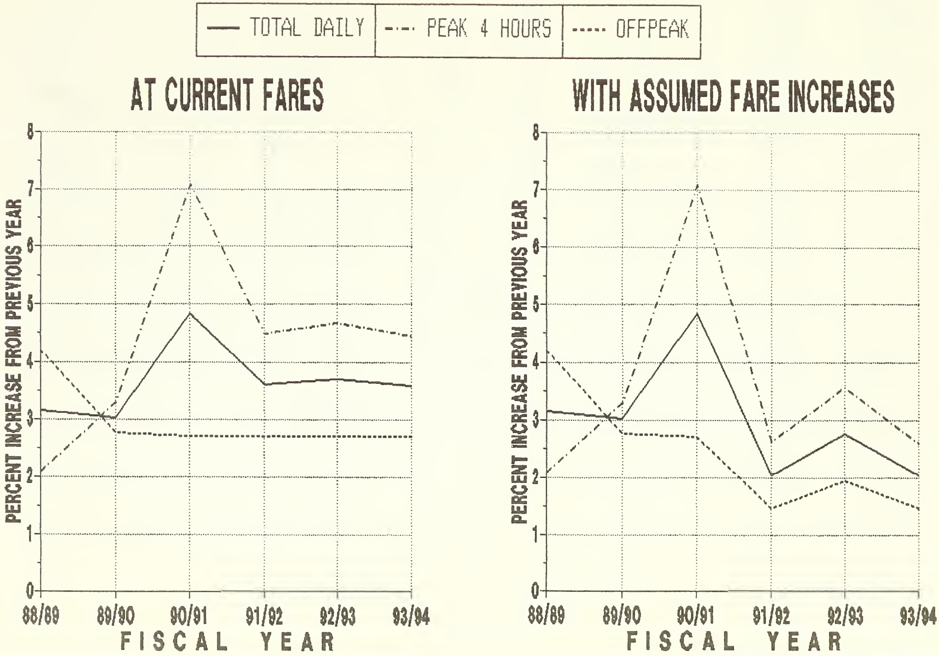


Figure 10

FORECAST ANNUAL GROWTH RATES FOR WEEKDAY TRIPS



effect of the assumed fare increases. Most of the ridership increase results from planned peak period service expansion, most of which is expected to be in place by FY 1990/91. Peak period growth after that year reflects both some additional service expansion as well as a lagged response to previous service increments. Offpeak riding is assumed conservatively to grow at 2.7% per year.

WHAT'S THE STRATEGY FOR ACHIEVING THE RIDERSHIP FORECAST?

BART's strategy for attracting additional customers and achieving its ridership forecast is based on:

(1) Completing key projects in FY 1989/90 to add capacity and to make the system more useful to more people.

(2) Providing the best service possible through continued efforts to improve customer consciousness on the part of all employees.

(3) Aggressively marketing BART service to promote ridership growth which will exceed forecast.

(4) Progressing towards the timely completion of longer-range projects which will allow BART to tap a greater share of regional travel.

Complete Key Projects In FY 1989/90

Activities to take place in the near term for promoting greater system use will focus on delivering projects which address the needs and concerns expressed by current and prospective BART riders.

More service and capacity is scheduled to occur with the November 1989 start of 3 minute 10 second peak scheduled service. Prior to that time, BART will be placing increasing numbers of C-cars into service as they are accepted from the manufacturer and within the current limits of availability (details for the phasing of higher frequency service and C-car availability are discussed in Chapter Two). BART's load factor policy governs how available cars are allocated. The details of this are also presented in Chapter Two.

Highly visible and important access improvements are programmed for completion in FY 1989/90 to help current BART riders, and others who would like to be, get to and from stations more easily. The 193-space Pleasant Hill parking project, which was deferred from FY 1988/89, is to be completed. Another project at Walnut Creek Station will add 250 more parking spaces, for a total of 443 new spaces by June 1990. For bus access, BART will be working closely with AC Transit as it begins to implement its route restructuring program.

As part of ongoing efforts to improve system access for mobility impaired persons, BART plans call for the adoption in FY 1989/90 of a multi-year master plan for elderly and handicapped facility improvements. Projects deemed to be feasible under current budget constraints will be initiated prior to June 1990.

BART will strive to expand the number of offsite outlets to 150 in order to make buying regular and discount tickets more convenient. In addition to these outlets which are open to the general public, BART will be working with the Regional Transit Association to expand the number of employers participating in the transit ticket distribution program.

In an effort to provide more effective information to passengers, new train schedule panels will be installed on the platform level of all stations by September 1989. BART riders will also see new retail businesses in stations. This will be the result of a concessions permit slated to be signed by August 1989 with Host International for the establishment of gift and sundry shops in five stations.

Improve Customer Consciousness

Efforts begun in FY 1988/89 will be carried forward for the purpose of developing and implementing a program for improving customer consciousness on the part of all BART employees. The pilot program currently in place will be evaluated, refined, and expanded to all departments in FY 1989/90. This applies to employees who deal directly with BART riders as well as to employees who have their fellow workers as their primary customer.

Aggressively Market BART Service

BART will continue to aggressively promote its service through broadcast and print media. The program identified in the 1989 BART Marketing Plan will serve as the blueprint for activities to occur in FY 1989/90 and beyond. Further, the Passenger Profile Survey, the eleventh since 1973, will be conducted in the Spring 1990. The results of this survey will serve as the basis for updating the current marketing program which seeks to increase ridership at least 1.5% above forecast.

Marketing activities will also focus on making information available to BART customers to assist them in their travel plans and use of the system. This is particularly important for infrequent or first-time customers, who may have limited or no knowledge of how or where to buy tickets, train routes and schedules, and key destinations the system serves. To meet this need, BART will continue to make available special brochures which provide information about these and other aspects of the system. Advance notice about special train service to major events will also be made available as part of marketing BART for non-work trips.

Make Progress Towards Completing Longer-Range Projects

BART ridership growth for years beyond FY 1989/90 will depend largely upon events which affect regional travel, and BART use in particular, as well as how well the system performs. The timely completion of longer-term projects supports continued ridership growth. As such, BART's program objectives for FY 1989/90 identify interim milestones for long-term projects as a means of assuring overall adherence to implementation timetables. As shown in Figure 4, interim milestones are identified for the Universal Ticket Project (program objective 5), elderly and handicapped facility improvements (program objective 6), and rail extensions (program objectives 14 through 18).

The Universal Ticket, which will make it easier to transfer between BART and connecting transit, is expected to become available for use by December 1990. Additional BART ridership is anticipated in response to the introduction and marketing of this fare instrument, which includes an ATM debit/credit card feature for purchasing tickets.

As part of a commitment to further increase system accessibility for mobility impaired persons, BART will be implementing feasible projects under a multi-year master plan for elderly and handicapped improvements. This program directly supports increased ridership by making BART more useful to people who otherwise may not be capable of using the system.

System extensions are perhaps the longest-term projects contained in BART's Capital Improvement Program. The FY 1989/90 program objective to obtain initial earmarking of federal funds for extensions by October 1989 is a critical step toward groundbreaking. The remaining four FY 1989/90 program objectives for extensions call out completion dates for preliminary engineering of the four first-phase extension projects. These are currently slated to be operational by the late 1990s, and are projected to increase ridership about 35% above what the existing system is projected to carry in the year 2000.

In addition to the projects called out as program objectives are other projects in BART's Capital Improvement Program which directly support the achievement of its ridership forecast. Phasing in 58-train, 2 minute 15 second peak scheduled service by October 1992 is key to this effort. The addition of 10,583 new parking spaces by June 1994 (Figure 11) is also an important element needed for realizing BART's ridership projections (Figure 9). The reader should consult BART's 1989 Capital Improvement Program which provides details for these projects.

Figure 11

BART-OWNED PARKING SPACE INVENTORY AND PROGRAMMED EXPANSION PAVED FACILITIES AT EXISTING RAIL STATIONS AND EXPRESS BUS PARK/RIDE LOTS

(Status as of December 1988)

	STATION	SPACES AS OF DECEMBER 1988	PROGRAMMED ADDITIONS			PLANNED SPACES AS OF JUNE 1994
			FY 1989/90	FY 90/91-93/94	ADDED IN FIVE YEARS	
SAN FRANCISCO LINE:	Daly City	1,877	0	0	0	1,877
	Glen Park	55	0	0	0	55
	West Oakland	403	0	1,100	1,100	1,503
	SUBTOTAL	**2,335**	**0**	**1,100**	**1,100**	**3,435**
FREMONT LINE:	Fremont	2,374	0	0	0	2,374
	Union City	1,166	0	600	600	1,766
	South Hayward	1,252	0	0	0	1,252
	Hayward	967	0	650	650	1,617
	Bayfair	1,761	0	0	0	1,761
	San Leandro	1,226	0	0	0	1,226
	Coliseum	923	0	0	0	923
	Fruitvale	1,025	0	560	560	1,585
	(a)Lake Merritt	190	0	0	0	190
	SUBTOTAL	**10,884**	**0**	**1,810**	**1,810**	**12,694**
RICHMOND LINE:	Richmond	754	0	0	0	754
	El Cerrito del Norte	1,607	0	1,960	1,960	3,567
	El Cerrito Plaza	760	0	0	0	760
	North Berkeley	778	0	0	0	778
	Ashby	560	0	0	0	560
	MacArthur	609	0	0	0	609
	SUBTOTAL	**5,068**	**0**	**1,960**	**1,960**	**7,028**
CONCORD LINE:	Concord	1,912	0	1,735	1,735	3,647
	Pleasant Hill	1,778	193	1,200	1,393	3,171
	Walnut Creek	1,263	250	1,135	1,385	2,648
	(b)Lafayette	1,446	0	0	0	1,446
	(b)Orinda	1,320	0	0	0	1,320
	Rockridge	776	0	550	550	1,326
	SUBTOTAL	**8,495**	**443**	**4,620**	**5,063**	**13,558**
TOTAL:	**RAIL STATIONS**	**26,782**	**443**	**9,490**	**9,933**	**36,715**
BART EXPRESS BUS PARK/RIDE FACILITIES:						
	North Concord/Martinez	538	0	0	0	538
	West Pittsburg	213	0	0	0	213
	Pittsburg	0	0	200	200	200
	West Antioch	0	0	200	200	200
	East Antioch	252	0	0	0	252
	Dublin/Pleasanton	0	0	0	0	0
	West Livermore	0	0	200	200	0
	Hercules	0	0	0	0	0
	Brentwood	0	0	100	100	0
TOTAL:	**EXPRESS BUS PARK/RIDE**	**1,003**	**0**	**700**	**700**	**1,703**
GRAND TOTAL:	**RAIL STATIONS AND EXPRESS BUS**	**27,785**	**443**	**10,190**	**10,633**	**38,418**

(a) A 25¢ parking charge is in effect at Lake Merritt Station. All other BART-owned parking is free.
(b) These free spaces at Lafayette and Orinda Stations are subject to special parking controls.

CHAPTER TWO:

BART SERVICE DELIVERY

- o What Has Recent Train Service Been Like?
- o What's The Program For Improving And Expanding Service?
- o What Service Delivery Standards Will Be In Effect?
- o What's The Outlook For BART Extensions?
- o What Are Other Important Service Delivery Concerns?

The delivery of quality service is based on effective programs in all phases of operations, maintenance, and implementing expansion plans. BART's ridership has repeatedly been found to be sensitive to both the quality and quantity of its service. The achievement of high performance standards through the timely implementation of BART's Capital Improvement Program remains BART's top priority.

The following discussion begins by looking at recent train service in terms of the performance indicators and program objectives which were adopted for FY 1988/89. This is followed by a discussion of BART's strategy for expanding service in the near term, as well as with regard to longer-range plans for realizing system extensions. Finally, other important service delivery considerations are discussed along with BART's strategy for maintaining high performance standards with regard to these concerns.

WHAT HAS RECENT TRAIN SERVICE BEEN LIKE?

BART's service schedule for weekdays, weekends, and holidays is summarized in "BART FACTS" which appear on the inside-front and inside-back covers of this document. (The completion of the Daly City Turnback requires the addition of three trains, one on each transbay route, to maintain the same headways as called for under the 45-train schedule.) This schedule has been in effect since November 1986. The maximum service frequency is currently 17 trains per hour in the peak demand direction through downtown San Francisco and Oakland, both of which are served by three of the system's four routes. This schedule is based on a minimum sustainable service headway of 3 minutes 45 seconds during peak operating times except for a train every 3 minutes during the peak 15 minutes.

Analysis of passenger flows by means of automated faregate and train history information systems serves as the basis for allocating capacity on each route. (As discussed below, this effort also serves as the basis for projecting future demand and car requirements, both of which are key inputs to BART's budget forecast.) BART's load factor monitoring program is key to this effort. As shown in Figure 8, the recent rise in demand has pushed load factors for all peak period trains to their highest level in 2 1/2 years. Delays in the delivery of C-cars and their availability, as discussed below, have negatively impacted BART's ability to lengthen peak period discretionary trains. This has resulted in discretionary train load factors averaging 6% in excess of the 1.00 standard (ie: a seat for every rider, on average). Because of the lack of C-cars, BART has been sizing trains to balance load factors across all four routes.

Current system capabilities appear quite sufficient to meet offpeak demand now and in the foreseeable future. Evidence of this lies in the fact that offpeak system load factors have averaged between 0.70 and 0.80 for the past 5 years. The maximum average load factor for individual offpeak trains seldom exceeds the 1.00 standard. Because of this, BART's challenge has been to expand capacity to meet what appears to be a suppressed peak demand. System use during the busiest 4 hours (6:30-8:30 a.m. and 4:00-6:00 p.m.) currently accounts for slightly less than one half of all weekday trips.

Until headways can be reduced below current levels, efforts for delivering maximum capacity have focused on achieving BART's service delivery standards. Of first concern is to achieve high maintenance standards so that the maximum number of cars can be made available to form trains. BART's preventative maintenance program for vehicles is based on 4 a.m. availability of 85% for A-cars and 90% for B-cars. Like the control equipped A-cars, C-car availability is also slated to be 85%, eventually. Achieving this will depend upon correcting the problem with the C-car's electrical inverter system, which has resulted in an availability for the new vehicles at a little more than one-half the desired level -- 46%.

A delay in receiving the C-cars from Soferval and the car's low availability have resulted in a 7-month slip for the start of 51-train, 3-minute 10-second service. Completion of the Daly City Turnback in July 1989 will require 3 additional trains, one on each transbay route, in order to maintain current headways using the new facility. Soferval's current C-car delivery schedule and the current level of C-car availability will provide the necessary cars to make up these trains, which will be placed in operation following completion of the turnback. Additional capacity, which was to have been provided by 3 more trains (for a total of 51 trains on line) starting in April 1989, will now occur in November 1989 when a sufficient number of C-cars will be available to support this expansion and a corresponding scheduled peak headway reduction to 3 minutes and 10 seconds.

It should be noted, although C-cars were not part of BART's vehicle requirements for 45-train service in FY 1988/89, the new vehicles were placed in service beginning in March 1988. During the first half of FY 1988/89, there was an average of 17 C-cars available for service by 4 a.m. each day. The introduction of the C-cars had an immediate dual and somewhat offsetting impact on BART service. On the one hand, introduction of the new cars, shining inside and out, added attractive seating capacity. On the other hand, the lower than expected reliability of the C-cars as they have been introduced into service created a problem.

The overall lower than expected reliability for the C-cars required expenditure of disproportionate and unplanned levels of maintenance resources and inventories in order to keep them in service. The extraordinary parts and maintenance requirement of the C-cars necessitated the diversion of resources from the A- and B-car fleet, which resulted in reduced A- and B-car availability. An additional contributing factor for reduced car availability was a substantial increase in A- and B-car propulsion system failures beginning in November 1988. A task force formed to address this problem found the principle causes to be defective motor brushes and out-of-round commutators in the brush track.

A-car availability during the first half of FY 1988/89 averaged 73.4% compared to an 85.0% standard. This resulted in an average of 99 A-cars available for for the B-car shortage during the first half of FY 1988/89. The resulting availability for BART's fleet of A-,B-, and C-cars meant that actual capacity was 4 cars short of on-line service requirements.

Efforts are being made to solve the problem of C-car reliability and its adverse effect on overall availability. In the short term, BART's maintenance resources and inventories are being increased to levels which can accomplish the required C-car maintenance without adversely affecting A- and B-car maintenance. By March 1989, A- and B-car availability returned to favorable levels as the result of this effort and that of the task force (which identified defective motor brushes and commutators). At the same time, Soferval is focusing engineering efforts to make necessary design changes to improve C-car availability.

Once placed in service, trains must perform as scheduled, delivering capacity when and where needed to meet customer demands. This means equipment must perform allowing trains to operate, ideally, without delay. To help minimize service disruptions, BART's delay monitoring program tracks delay incidents and their causes. The more stringent 5-minute delay threshold adopted for FY 1988/89 reflects successful efforts in achieving the standards established for the prior 7-minute threshold. During the first half of FY 1988/89, BART achieved a 5-minute delay rate of 3.49 events per 100 train runs. This compares to a standard of 3.00 events per 100 train runs or less. The current level for delay events has resulted in 9.69 trains delayed more than 5 minutes per 100 train runs. This compares to a standard of 8.00 trains delayed per 100 train runs or less.

The resulting performance for car availability and delays is reflected by BART's two key indicators for train service delivery. The first is peak period transbay car throughput which calls for achieving a standard of 97.5% of scheduled capacity. As shown in Figure 12, 1988 performance with respect to peak period transbay car throughput has been favorable with the exception of the first quarter of FY 1988/89 when the combination of below standard car availability and delays impacted service delivery. Fewer delay events and delayed trains in the second quarter helped push peak period transbay car throughput back over the 97.5% standard.

The second key indicator for train service delivery is patron on-time, which measures the proportion of customers affected by service delays. Automated faregate and train history information systems enable BART to measure the percentage of riders delivered to their destination stations on-time relative to train run times. Figure 13 shows favorable performance for patron on-time for all-day operations. The system averaged above the 94.0% standard for 8 of 10 consecutive quarters. Two quarters dipped just under this mark. Patron on-time for peak period operations (not shown in Figure 8) has been running about 1% below the all-day average. Daily and peak period patron on-time performance for the first half of FY 1988/89 averaged 94.8% and 93.7%, respectively.

In summary, recent service has been favorable based on BART's key service delivery indicators. As stated, an acceptable proportion of BART riders arrived on time and maximum transbay capacity was provided to within an acceptable percentage of schedule on this most heavily traveled system link. The number of on-line BART vehicles was within 1% of the District's 4 a.m. requirement. The more stringent standards for delay events and delayed trains presented a challenge to BART under the new 5-minute threshold. This challenge will continue as efforts are made to reduce delays and their impact on service.

Figure 12

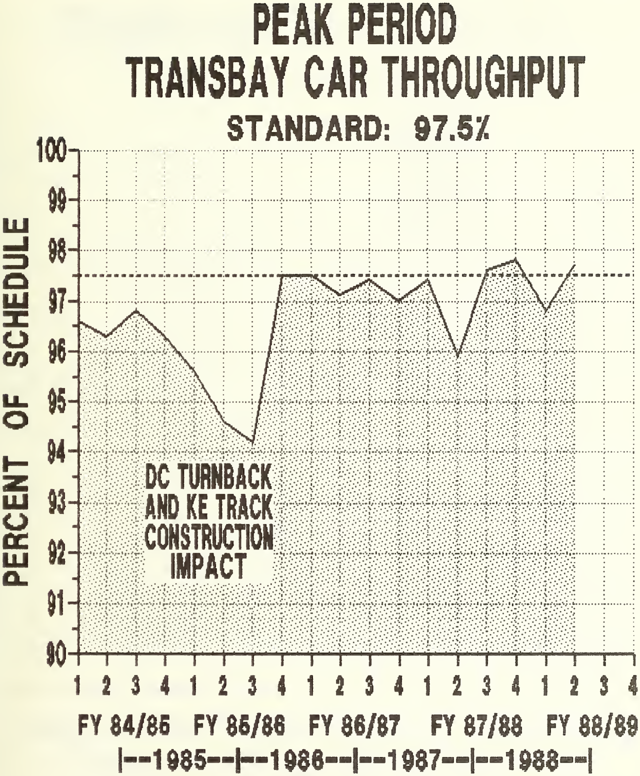
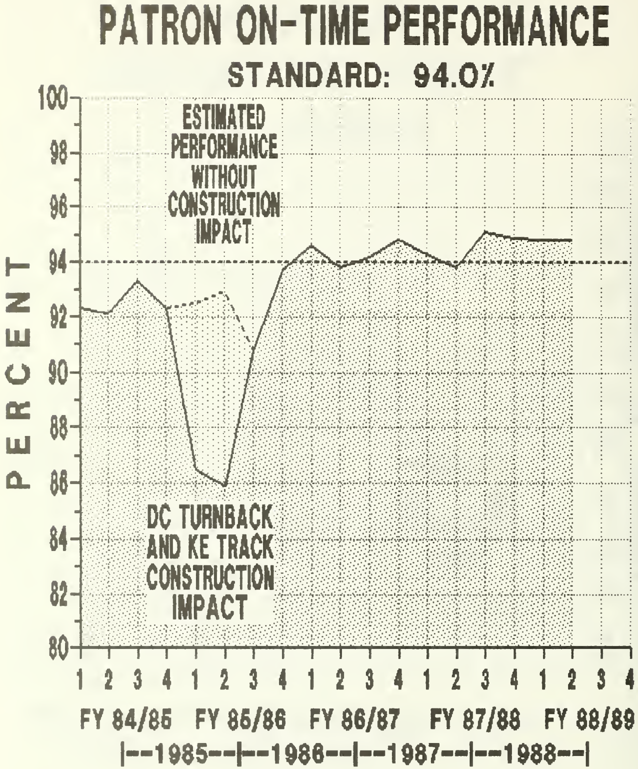

PEAK PERIOD
TRANSBAY CAR THROUGHPUT
STANDARD: 97.5%
PERCENT OF SCHEDULE
100
99
98
97
96
95
94
93
92
91
90
DC TURNBACK AND KE TRACK CONSTRUCTION IMPACT
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 84/85 FY 85/86 FY 86/87 FY 87/88 FY 88/89
|--1985--|--1986--|--1987--|--1988--|

Figure 13


PATRON ON-TIME PERFORMANCE
STANDARD: 94.0%
PERCENT
100
98
96
94
92
90
88
86
84
82
80
ESTIMATED PERFORMANCE WITHOUT CONSTRUCTION IMPACT
DC TURNBACK AND KE TRACK CONSTRUCTION IMPACT
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 84/85
FY 85/86
FY 86/87
FY 87/88
FY 88/89
|--1985--|--1986--|--1987--|--1988--|

WHAT'S THE PROGRAM FOR IMPROVING AND EXPANDING SERVICE?

BART's strategy for improving and expanding service is based on the timely implementation of its Capital Improvement Program which is presented in detail in a separately bound 1989 edition. The driving force and focus for this effort for the past decade has been the implementation of the Capacity Expansion Program consisting of key requisite projects for reducing headways and adding trains. The projects which comprise this program, their respective completion dates, and expanded service start dates are summarized in Figure 14. (The target dates shown reflect the status as of March 1989 for project implementation and new service start up, which correspond to the ridership and financial projections. These target dates may be altered by changes in project completion schedules.)

Four service increments are programmed for implementation during the next 3 years as completion of supporting capital projects permits. The net result will be to increase the number of trains on line from 48 now to 58 by October 1992, while respective service frequencies will increase peak transbay service from 17 trains per hour now to 26 per hour by April 1991. Figure 15 depicts this service expansion in graphic form. This expansion is to be accomplished as described in the following four sections. Projected peak period online service requirements are summarized in Figure 16 for each service increment. **Planned service increments reflect estimated requirements based on current demand projections. Should these requirements change prior to start-up dates, service increments will be changed accordingly.**

51-Train Service By November 1989

Receipt and acceptance of 98 C-cars by October 1989 will provide a minimum of 58 new vehicles for service under the anticipated C-car availability rate (as governed primarily by the status of the electrical inverter system and maintaining an adequate spare parts inventory until problems with this system are resolved). This will allow for the operation of 3 additional trains, bringing the total on line to 51, and reduction of the minimum scheduled headway to 3 minutes and 10 seconds. Based on anticipated demand and ananalysis of load factors, two of these trains are to operate during the peak hour, one each on the Concord and Fremont/Daly City routes. The third new train is to be placed in service during the balance of the peak period on the Concord/Daly City route in order to maintain load factors within acceptable limits.

52-Train Service By October 1990

By October 1990, minimum headways are to be reduced to 2 minutes 30 seconds, and one new train will be placed in service for a total of 52 on line. Completion of system resignaling will increase operating speeds enough to offset the 3-train Daly City Turnback requirement. This will effectively result in a net capacity increase of 4 trains, all of which are slated to operate during the peak hour on transbay routes. Five Capacity Expansion Projects are scheduled for completion within a 17-month period to support this service level. These are identified in Figure 14. Additionally, the receipt and acceptance of all 150 C-cars by September 1990 will provide 101 new vehicles under the anticipated availability rate.

Figure 14

BART CAPACITY EXPANSION PROGRAM
STATUS AS OF MARCH 1989
Target Dates May Be Altered By Changes In Project Completion Schedules

04/12/89

Minimum Headway Capability (Min:Sec)	Projects Required To Achieve or Support This Headway	Anticipated Project Completion Dates	Target Expanded Service Start Dates	Peak Hour Trains Peak Direction Transbay	Peak Period Capacity Trains		On-Line Cars	Spare Cars	Total Cars Required	Available Fleet (Extra)	Fleet Accepted by Engineering	
3:45	Current Service	---	Nov 86	17	45	A C B T	90 8 248 346	14 2 24 40	104 10 272 386	114 (+10) 10 272 396 (+10)	136 48 303 487	A C B T
	47 C-Cars Available for Operations	Jul 89				A C B T	96 42 243 381	14 2 24 40	110 44 267 421	114 (+4) 44 272 (+5) 431 (+9)	136 83 303 522	A C B T
	Daly City Turnback	Jul 89	Aug 89	17	48							
3:10	58 C-Cars Available for Operations	Oct 89	Nov 89	19	51	A C B T	100 52 248 400	14 6 24 44	114 58 272 444	114 58 272 444	136 98 303 537	A C B T
2:30	New On-Board ATC (A-Car Retrofit)	Jul 89										
	Daly City Yard	Sep 89										
	M-87 Interlocking	Nov 89										
	Wayside Train Control/System Performance Mods	Jun 90										
	Electrical Capacity Increase: - Procure/Install Substation	Sep 90										
	101 C-Cars Available for Operations	Sep 90	Oct 90	23	52	A C B T	100 91 232 423	14 10 30 54	114 101 262 477	114 101 272 (+10) 487 (+10)	136 150 303 589	A C B T
2:15	Brake Rate Algorithm Modifications	Mar 91				A C B T	100 94 239 433	14 10 30 54	114 104 269 487	114 104 272 (+3) 490 (+3)	136 150 303 589	A C B T
	104 C-Cars Available for Operations	Mar 91	Apr 91	26	55							
	ICS	May 90				A C B T	100 110 242 452	14 10 30 54	114 120 272 506	114 120 272 506	136 150 303 589	A C B T
	120 C-Cars Available for Operations	Sep 92	Oct 92	26	58							
	128 C-Cars Available for Operations	Jul 93	Sep 93	26	58	A C B	100 118 242	14 10 30	114 128 272	114 128 272	136 150 303	A C B

Figure 15

PROGRAMMED SERVICE EXPANSION

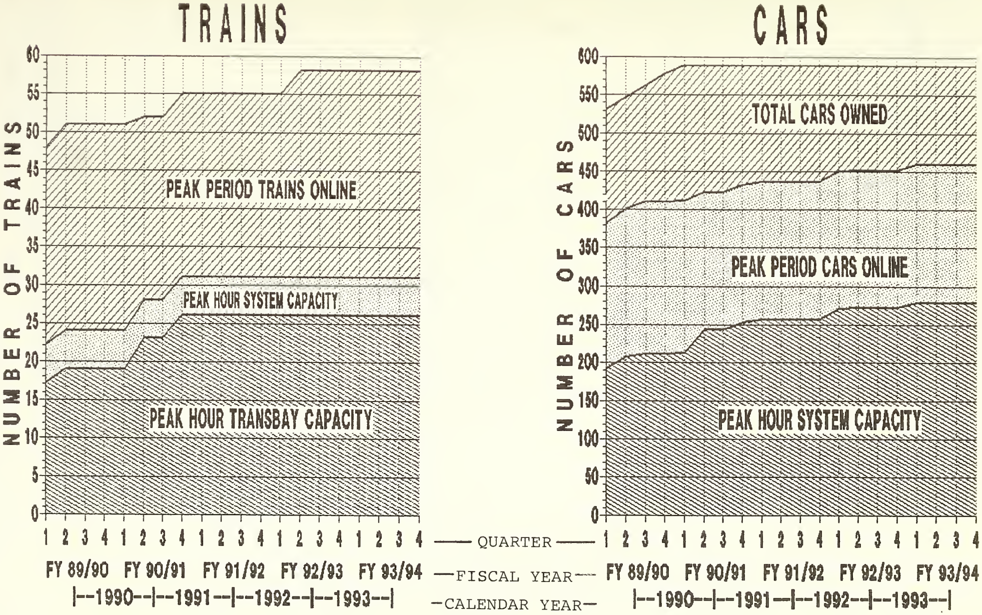


Figure 16

PROJECTED PEAK PERIOD ONLINE REQUIREMENTS: TRAINS AND CARS*

	SERVICE START DATE AND MINIMUM SCHEDULED HEADWAY (Min:Sec)					
	AUG 1989	NOV 1989	OCT 1990	APR 1991	OCT 1992	SEP 1993
	3:45	3:10	2:30	2:15	2:15	2:15
TRAINS ONLINE						
PEAK 60 MINUTES						
Concord/Daly City	7	8	10	11	11	11
Fremont/Daly City	6	7	8	9	9	9
Richmond/Daly City	4	4	5	6	6	6
Transbay	17	19	23	26	26	26
Fremont/Richmond	5	5	5	5	5	5
System	22	24	28	31	31	31
BALANCE OF PEAK PERIOD						
Concord/Daly City	9	10	9**	9	10	10
Fremont/Daly City	6	6	5**	5	6	6
Richmond/Daly City	6	6	5**	5	6	6
Transbay	21	22	19	19	22	22
Fremont/Richmond	5	5	5	5	5	5
System	26	27	24	24	27	27
TOTAL PEAK PERIOD						
Concord/Daly City	16	18	19	20	21	21
Fremont/Daly City	12	13	13	14	15	15
Richmond/Daly City	10	10	10	11	12	12
Transbay	38	41	42	45	48	48
Fremont/Richmond	10	10	10	10	10	10
System	48	51	52	55	58	58
CARS ONLINE						
PEAK 60 MINUTES						
Concord/Daly City	70	80	96	100	108	110
Fremont/Daly City	60	63	75	79	86	89
Richmond/Daly City	37	39	46	48	52	55
Transbay	167	182	217	227	246	254
Fremont/Richmond	24	24	25	25	25	25
System	191	206	242	252	271	279
BALANCE OF PEAK PERIOD						
Concord/Daly City	84	88	87**	87	87	87
Fremont/Daly City	48	48	41**	41	41	41
Richmond/Daly City	42	42	37**	37	37	37
Transbay	174	178	165	165	165	165
Fremont/Richmond	16	16	16	16	16	16
System	190	194	181	181	181	181
TOTAL PEAK PERIOD						
Concord/Daly City	154	168	183	187	195	197
Fremont/Daly City	108	111	116	120	127	131
Richmond/Daly City	79	81	83	85	89	92
Transbay	341	360	382	392	411	419
Fremont/Richmond	40	40	41	41	41	41
System	381	400	423	433	452	460
SPARE CARS	40	44	54	54	54	54
TOTAL CAR REQUIREMENT	421	444	477	487	506	514

---

*Planned service increments reflect estimated requirements based on current demand projections. Should th requirements change prior to start-up dates, service increments will be changed accordingly.

**Decreased on-line train and car requirements relative to 3 minute 10 second service reflect increa operating speed due to system resignaling.

55-Train Service By April 1991

By April 1991, minimum headways are to be reduced to 2 minutes 15 seconds, and 3 more trains added for a total of 55 on line. The ridership forecast and load factor policy call for all these new trains to operate during the peak hour, one on each of the three transbay routes. Completion of modifications to the brake rate algorithm in March 1991 is the Capacity Expansion Project required for this service level. C-car availability is slated to reach 69%, allowing for 104 of these cars to be placed in service.

58-Train Service by October 1992

Finally, by October 1992, minimum 2-minute 15-second headways will be extended into the balance of the peak period with the addition of 3 new trains which are to operate during this time. The key controlling factor is C-car availability as related primarily to the vehicle's electrical inverter system. Assuming correction of this problem, current plans call for having 120 C-cars available for service by September 1992 (reflecting 80% availability). Maximum 85% C-car availability is anticipated by July 1993. At that time, 128 C-cars should be available for service bringing BART's total on-line fleet to 514 cars (includes 54 ready spares).

WHAT SERVICE DELIVERY STANDARDS WILL BE IN EFFECT?

BART's guiding philosophy has been to add service whenever possible only if service quality can be maintained. Conversely, BART will not add new service if its impact will cause a degradation of performance. The standards are specified within BART's performance indicators (Figure 5). The status of the train service delivery measures were discussed in previous sections in terms of the standards which were adopted for FY 1988/89. The following presents the revised policy for the train service delivery measures for FY 1989/90 and beyond.

Car Availability

Much of the discussion has focused on C-car availability which, along with receipt of the new cars from Soferval, is central to supporting more service. Efforts during FY 1989/90 will concentrate on achieving 75% C-car availability. Achievement of maximum 85% availability for the new cars is largely dependent upon resolving problems with the car's electrical inverter system and effective provisioning of critical spare parts. Availability for A- and B-cars is to be maintained at 85% and 90%, respectively.

Service Delays

Efforts will focus on achieving the more stringent 5-minute threshold rate for peak period delay events and delayed trains which has been carried over from FY 1988/89.

Car Throughput

No change has been made with respect to this standard. Efforts during FY 1989/90 will focus on delivering at least 97.5% of peak period transbay car throughput in support of accommodating and promoting ridership.

Load Factors

Recent above forecast ridership growth and delays in the C-car delivery schedule have precluded the achievement of the FY 1988/89 load factor standard of 1.00 for peak period discretionary trains. Accordingly, this standard has been increased to 1.15 which provides a comfortable environment for standing riders. The offpeak load factor standard of 1.00 has been retained for FY 1989/90.

Patron On-Time

Efforts in FY 1989/90 will focus on continuing to achieve BART's 94% patron on-time performance standard.

WHAT'S THE OUTLOOK FOR BART EXTENSIONS?

Passage of dedicated transportation tax measures in both Alameda and Contra Costa counties and increased bridge tolls have provided an infusion of local matching funds for BART extensions. Additionally, an agreement successfully negotiated with SAMTRANS supports extending BART on the Peninsula as well as in the East Bay.

MTC's New Rail Starts Program continues to be the principal mechanism through which funding for BART's Extensions Program is coordinated. In light of new local funding sources, progress for this effort has led to the acceleration of implementation timetables for BART extensions. BART's five Extensions Program objectives for FY 1989/90 focus on earmarking of federal funds and completion of environmental work and preliminary engineering for the four first phase extensions (Figure 4). While extension plans continue to be refined (vis-a-vis logical terminal stations and other revisions in response to changing conditions), implementation of the first phase extensions program is emerging as one of BART's top priorities for the 1990s. Figure 17 presents BART's policy for extensions. Anticipated target completion dates for BART's first phase extensions, which are to be implemented concurrently, are now set for the latter 1990s.

WHAT ARE OTHER IMPORTANT SERVICE DELIVERY CONCERNS?

Delivery of quality train service depends on, and is supported by, the achievement of high standards for other important aspects of BART operations. First and foremost is safety, an undisputable requirement for which there is no compromise. The ease with which increasing numbers of passengers can safely move through stations, both horizontally and vertically, is also of concern. BART's express bus service, too, is a consideration in terms of its effectiveness and performance. The following sections focus on these three

Figure 17

BART EXTENSION STAGING POLICY[1]

	INSIDE CURRENT DISTRICT		OUTSIDE CURRENT DISTRICT[2]
I.	North Concord/West Pittsburg Irvington/Warm Springs Castro Valley/Dublin MUNI Metro Extension Project[3]	I.	Colma/Tanforan/San Francisco Airport Milpitas
II.	Pittsburg/West Antioch/East Antioch Pleasanton/West Livermore/East Livermore San Francisco[4] San Pablo/Hilltop Oakland Airport Connector	II.	Millbrae-Menlo Park Milpitas-San Jose
III.	San Francisco[4] Pinole-Crockett San Ramon Corridor	III.	San Jose-Menlo Park

NOTES:

1. The several segments shown under each Roman numeral are understood to be implemented concurrently, to the extent that funding is available. BART will be the operator for any new heavy or light rail transit starts or extensions within the three BART counties except for those projects developed by existing rail transit operators.

2. Subject to a satisfactory cost-sharing arrangement and parallel construction within the District. Pursuant to Section 29034.5 of the California Public Utilities Code, only non-District funds may be spent by the District for the purpose of extending services and facilities outside of District's January 1, 1971 boundaries until the District meets specified service commitments within the 1971 boundaries.

3. The San Francisco Project is identified through coordination with the City and County of San Francisco as the MUNI Metro Extension to the CALTRAIN Depot South of Market.

4. Specific San Francisco Project to be identified through coordination with the City and County of San Francisco. Section 29034.5 of the California Public Utilities Code lists an extension of District services and facilities to the northwest section of the City and County of San Francisco as a District service commitment.

Board adopted 9/1/83.
Board amended 2/2/84, 10/23/86, 5/14/87, 3/9/89.

aspects of BART's service delivery. A review of recent performance versus the FY 1988/89 policy is presented along with BART's plans for the upcoming five year period.

Safety and Security

Safety considerations are addressed by BART's Safety Department which oversees all aspects of operations as well as the design of modifications and new facilities. Incidents of customer accidents are closely monitored and analyzed, and appropriate actions are taken to minimize occurrences. In 1988, BART's rate fluctuated between 12 and 15 customer accidents for every million trips made on the system. Five years earlier, this rate was in the range of 16 to 17 per million passenger trips. For the first half of FY 1988/89, BART had a rate of 13.7 accidents per million trips. This is considerably below the standard established for customer safety of 17.7 accidents per million trips. The FY 1988/89 standard has been carried over into the 1989/90 fiscal year.

BART's strategy for maintaining favorable customer safety will continue to be based on stringent adherence to industry-accepted standards and safety oversight in the design of facilities and methods of operation. This includes concerns for how trains, elevators, and escalators operate, and how passengers circulate on station platforms and stairways.

Safety related activities will continue to be coordinated with local emergency service providers (i.e., fire departments, first aid units, hospitals, etc.) as called for under BART's Emergency Preparedness Program. The safety standard to conduct a minimum of one emergency plan exercise each month with outside agencies has repeatedly been exceeded. This standard will remain in effect during FY 1989/90.

Occurrences of industrial injuries are monitored and analyzed as part of an effort to maintain a safe work environment. For purposes of presenting this information in this document, employee accidents are discussed in terms of BART's performance indicator for employee lost time. This discussion is presented in the context of productivity and appears in Chapter Three.

With regard to security, data for crimes committed against BART customers (other than disorderly conduct) reveal a flat profile. The rate has fluctuated between 9 and 12 incidents per million passenger trips over the past 5 years. This compares to the rate for disorderly conduct which has increased from 6 to 24 incidents per million passenger trips during the same five year period. Increased citations for disorderly conduct are partly the result of implementing more effective methods for the surveillance of trains, stations, parking lots, and other BART property. Over the years, more effective coverage (hence, more citations) have also been the result of adding fully sworn officers and support staff. Eight positions will be added to BART's Police Services Division in FY 1989/90, bringing the total to 142. BART will continue to strategically deploy its sworn police officers to fulfill its commitment for providing transportation that is both safe and secure.

Passenger Movement Through Stations

Maintaining unimpeded passenger movement through stations requires that vital station equipment be maintained to high standards. Anything less will lead to an unacceptably high incidence of out-of-service faregates, ticket machines, elevators, escalators, and other equipment. This delays and inconveniences customers, factors which directly impact ridership. Because of this, efforts have focused on maintaining AFC equipment to a stringent standard of 0.30 incidents or less (which require maintenance technician services) per 1,000 passenger trips. As shown in Figure 18, AFC performance for the past year has been favorable relative to this standard.

Similar emphasis has been given to elevator and escalator performance, since this equipment is vital for vertical passenger movement in stations. This is especially important for mobility-impaired passengers, many of whom depend upon this equipment for access to stations. Programs to improve elevator and escalator performance have been completed and others are underway. Progress to date has permitted BART to increase the FY 1988/89 availability standard for this equipment from 96% to 97% during FY 1989/90. Actual availability for the first six months of FY 1988/89 was 99.5% and 96.5% for elevators and escalators, respectively. Other aspects of the system will continue to be evaluated for the purpose of identifying new projects which may enhance passenger movement through stations. This includes consideration for station signs, schedule and information displays, and announcements.

BART Express Bus Service

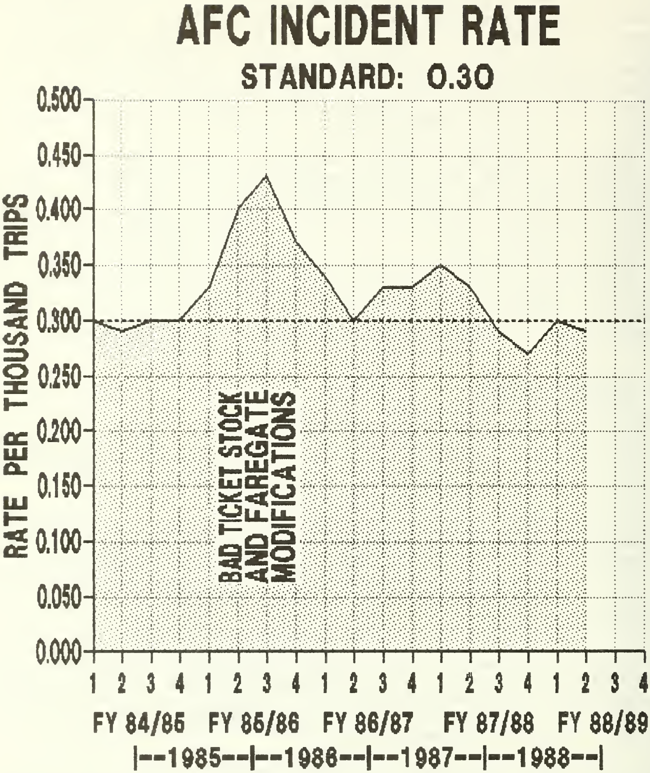
BART express buses operate on 11 routes within 4 major travel corridors not served by rail in both Alameda and Contra Costa counties. The system map on the back cover of this document identifies these corridors along with the BART stations to which they are linked. Express bus service frequencies are summarized in "BART FACTS" on the inside-front cover.

The provision of express bus service is an important element in BART's access and extensions programs. For access, the service provides a transit alternative for travel to rail stations where parking is, at best, difficult to find. For extensions, express bus service represents a logical step in a progression of line-haul improvements which may ultimately lead to the extension of BART lines.

Route restructuring and streamlining implemented over the past three years for BART express bus operations have resulted in a transfer of some service to local transit providers. Prior to route streamlining, typically 50% of 8,000 average weekday customers used the service for travel other than to connect with BART rail. More recently, 70% of 8,000 express bus riders use the service in conjunction with rail travel.

Prior to January 15, 1989, BART provided express bus service through a purchase of services agreement with AC Transit which maintained and operated 45 wheel-chair lift and specially painted vehicles needed to deliver the schedule. Among the stipulations contained in the contract was one which required that buses operate to achieve 95% on-time performance. Based on routine sampling conducted by AC staff, this requirement was repeatedly met or

Figure 18


AFC INCIDENT RATE
STANDARD: 0.30
RATE PER THOUSAND TRIPS
0.500
0.450
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
BAD TICKET STOCK
AND FAREGATE
MODIFICATIONS
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 84/85
FY 85/86
FY 86/87
FY 87/88
FY 88/89
|--1985--|--1986--|--1987--|--1988--|

exceeded. Recent express bus on-time performance averaged 97.0% for the first half of FY 1988/89.

BART express bus service is currently provided by Laidlaw Transit Incorporated under a new purchase of service agreement. Delivery of the same service schedule by Laidlaw is estimated to cost BART $2,040,600 less annually compared to the last full fiscal year under the contract with AC Transit. This savings is based on a 1987/88 fiscal year expense of $8,445,100 with AC Transit versus a budgeted expense of $6,404,500 with Laidlaw in FY 1989/90.

Plans for improving the service and increasing ridership include making the universal (bus/rail) ticket available by December 1990, and completing express bus park-ride lots in West Livermore in FY 1990/91 and in Pittsburg and West Antioch in FY 1991/92. Additionally, BART will continue to work with local agencies and private interests with respect to implementing possible route changes to better serve these rapidly growing areas.

CHAPTER THREE:

PRODUCTIVITY AND EFFICIENCY

- How Productive And Efficient Has BART Been?
- What's The Plan For Improving Productivity And Efficiency?
- What Impact On Productivity Will These Improvements Have?

To BART, productivity and efficiency mean delivering quality transportation service where production costs are held in line relative to revenues. Accordingly, BART's strategy for accomplishing this has been through the development of its resources, both human and technological, while simultaneously exploring traditional and innovative ways to expand the organization's revenue base.

Efforts to improve productivity and efficiency reflect BART's goal to develop and maintain a workforce that is motivated to provide the best service possible. This includes BART's commitment to affirmative action, creating a positive work environment, and promoting upward mobility.

On the technological side, productivity and efficiency are key justifying criteria BART uses to develop its Capital Improvement Program (i.e., projects which can help increase output at a rate higher than the commitment of resources).

The following discussion begins by looking at the organization and how productive it's been. Key determining factors are identified and results of recent efforts are presented. The FY 1988/89 performance indicators and standards for productivity and efficiency and supporting program objectives constitute the bases for this discussion. This is followed by a presentation of what BART will be doing to promote productivity and efficiency, both in the short and long term. Revised standards are identified for BART's FY 1989/90 productivity and efficiency performance indicators, along with the program objectives that will assist in their achievement (Figures 4 and 5).

HOW PRODUCTIVE AND EFFICIENT HAS BART BEEN?

Efforts for improving BART productivity and efficiency have focused on controlling operating expenses relative to stimulating revenues from passenger fares and other sources. Because labor expense constitutes about two-thirds of BART's total operating budget, emphasis has been placed on stepping up output with less than proportional staffing increases. The contracting of selected maintenance functions has provided cost advantages and has reduced the need for additional staffing. As part of the annual budget cycle, proposals for new positions undergo rigorous review. Recent Board authorization for additional staffing has been granted on the basis of supporting higher service levels and implementing BART's extension program.

The cornerstones of BART's strategy for increasing its labor output rests on investing in its employees. Accordingly, emphasis has been given to developing skills at all levels and management techniques necessary for advancing the organization.

One of BART's productivity and efficiency indicators is vehicle miles per equivalent employee, which measures labor input (hours worked) and output (car miles). BART has achieved increasing levels for this measure over the past 3 fiscal years. This is primarily the result of added car miles, reflecting the operation of longer offpeak and more peak trains versus a reduction in the number of hours worked. Comparison of data for FY 1985/86 and FY 1987/88 show a 3.0% increase in car miles (which would have been higher had the KE Track not been available) and a 2.0% net decrease of 40 equivalent operating staffbased on 2,000 hours worked annually. Recent performance shows that BART produced 17,501 vehicle miles per equivalent employee during the first half of FY 1988/89. This is 7.3% above the annual figure for FY 1987/88.

Other efforts to increase labor output have focused on reducing employee lost time as the result of both industrial injuries and sick leave. Maintaining a high level of safety awareness is central to minimizing accidents on the job. BART's Safety Department and Training Division provide courses to employees and conduct periodic reviews of work methods and procedures. The standard to maintain an employee industrial injury rate no higher than 0.50% of hours worked has not been achieved. This rate for the first half of FY 1988/89 was 1.24% of hours worked. As a result, BART is developing a comprehensive mitigation plan to reduce the industrial injury rate, as called for under the FY 1988/89 program objectives for safety. As of December 1988, the development of this plan is approximately half complete.

Efforts to promote employee wellness and control the use of paid sick leave have been fairly successful, though additional work is needed to achieve the standard rate of no higher than 3.50% of hours paid. On an annual basis, BART's paid sick leave rate has fluctuated between 3.60% and 3.90% for the past five fiscal years. The rate for the first half of FY 1988/89 was 3.78%.

Human resource development also includes BART's commitment to affirmative action. Recent efforts have focused on the implementation of BART's 1988 Affirmative Action Plan as a means of promoting upward mobility and achieving workforce representation objectives. Efforts have also focused on productively engaging in contracting for goods and services with local disadvantaged and minority owned businesses. BART's commitment to affirmative action is reflected by its standards for DBE/MBE participation, which have been set at 21% for all contracts determined to have DBE/MBE opportunities and 21% for all federally assisted contracts. Actual DBE/MBE participation during the first half of FY 1988/89 was 21.5% for all contracts and 9.1% for federally assisted contracts.

Cost control efforts for non-labor have focused on seeking to minimize expenses for electric power, express bus and shuttle service, and bus operator transfer subsidies. These three items constitute roughly 60% of all non-labor expense. Ongoing negotiations with PG&E have resulted in BART receiving the most favorable rates available for electric power. For BART, power costs are largely determined by the distance its vehicles travel. Efforts to minimize car miles and associated power costs have focused on sizing trains in accordance with BART's load factor policy.

Given available cars and headway constraints, BART has been fairly successful in providing appropriately sized trains in the primary demand direction. The inability to properly size trains for their much more lightly loaded "reverse run", however, has required BART to operate more car miles than necessary. This inability to properly size trains has prevented BART from reducing its power consumption any further than it has. Additionally, efforts to increase system utilization, or the ratio of passenger miles to seat miles, have failed to yield significant results because of having to operate trains that are

On the revenue side, the major thrust of improving BART's financial position has been through the attraction of more riders as discussed in Chapter One. Efforts have also been directed toward increasing revenue from other sources. Two programs have been put in place to address this need. These are joint development, and concessions and property management.

The primary purpose of BART's joint development program has been to seek enhancement of the organization's revenue base by increasing the productivity of station areas. Methods for accomplishing this include leasing of land and/or air rights at stations, incorporating special station entrances into developments, and coordinating efforts with local jurisdictions for developing land adjacent to BART stations. The realization of increased revenues through joint development has met with very limited success to date. While plans calling for major projects have been formulated for a number of stations, their implementation has been greatly hampered by unfavorable real estate market conditions. High vacancy rates for new office and other commercial space in suburban areas has effectively lowered BART's expectations for expanding revenues through joint development in the immediate future.

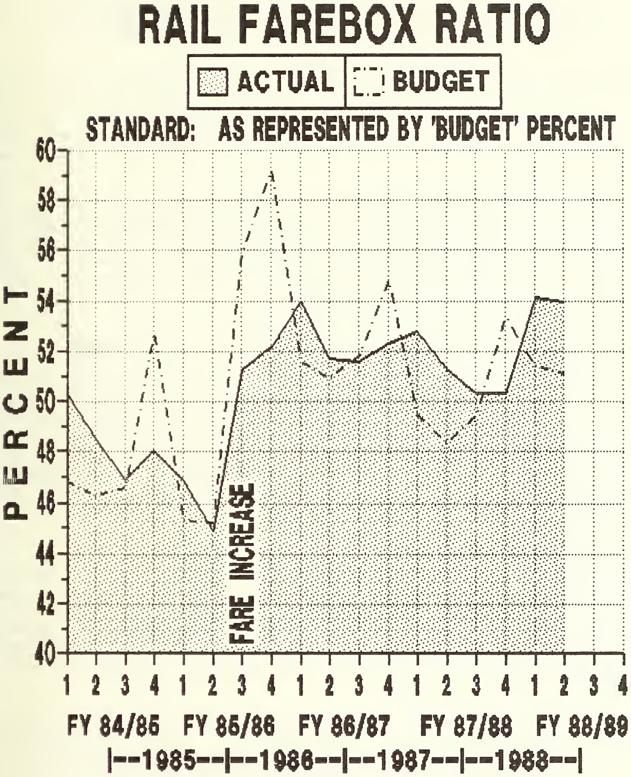
With the prospect of limited joint development opportunities, efforts have been stepped up for BART's concessions and property management program. Favorable permit and lease agreements which have been negotiated in the past two years have resulted in a 281% increase in revenue from this source. Recent negotiations with Federal Express, DHL, and UPS have led to the establishment of courier service facilities at 17 stations. Negotiations with other firms have continued and are expected to yield results within the coming year.

The net result of the foregoing efforts to hold costs down while expanding revenues is reflected by BART's performance as measured by five productivity and efficiency indicators. Three of these measure productivity in terms of recovery of operating costs from passenger fares. These are the farebox ratios for rail operations, express bus, and system operations. The fourth productivity indicator is the system operating ratio, which compares all sources of revenue to operating expense. Finally, the fifth indicator for productivity is BART's rail cost per passenger mile.

BART's rail farebox ratio has been designated as a key performance indicator. Performance relative to this measure is shown in Figure 19. Increasing ridership starting in early 1988 appeared to have stopped the generally downward trend for the rail farebox ratio, and helped push performance back up to the 54% mark for the first half of FY 1988/89. This is a level not achieved since mid-1986 just after the last fare increase. Recent performance is favorable compared to a budgeted rail farebox ratio of 51.2%.

The budgeted 10.3% farebox ratio for BART express bus operations was not achieved in FY 1987/88, with actual performance coming in at 8.5%. The express bus farebox ratio for the first half of FY 1988/89, under AC operations, was 9.5% versus a 10.1% budget objective. Service under a new contract with Laidlaw Transit Incoporated, a private sector firm, began in January 1989.

Figure 19


RAIL FAREBOX RATIO
ACTUAL
BUDGET
STANDARD: AS REPRESENTED BY 'BUDGET' PERCENT
PERCENT
60
58
56
54
52
50
48
46
44
42
40
FARE INCREASE
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 84/85 FY 85/86 FY 86/87 FY 87/88 FY 88/89
|--1985--|--1986--|--1987--|--1988--|

The much greater magnitude of rail revenue and expense to that for express bus means that the system farebox ratio (which includes both modes) closely mirrors the ratio for rail operations alone. Performance for the first half of FY 1988/89 with respect to BART's system farebox ratio is favorable, 49.4% actual versus a budget objective of 47.1%.

Performance for BART's system operating ratio, which includes all sources of revenue and expense, shows a similar pattern to the rail farebox ratio (Figure 20). Performance peaked just after the 1986 fare increase from a high of 56%, reducing to about 49% by mid-1988. Since then, this ratio has made a four percentage point gain as of the end of 1988. BART's year-to-date system operating ratio for the first half of FY 1988/89 was 52.8%, exceeding a budget objective of 50.3%.

The remaining productivity measure, and a key performance indicator, is the rail cost per passenger mile. As seen in Figure 21, recent performance has been very favorable. The overall downward trend beginning in mid-1987, when "belt-tightening" budgetary efforts began, has resulted in a decline in BART's production costs from 21.7¢ to 20.2¢ on a passenger mile basis. Current performance compares favorably to budget.

WHAT'S THE PLAN FOR IMPROVING PRODUCTIVITY AND EFFICIENCY?

BART's strategy for increasing productivity and efficiency over the next five years is based on stringent control of labor and non-labor expenses relative to phasing in expanded service. The methods and programs for accomplishing this are described below. BART's budget projections, which are discussed in detail in Chapter Four, are based on the anticipated financial requirements and results of these actions. This includes the targets for the productivity and efficiency performance indicators, such as the rail farebox ratio, which are derived from the budget.

Implement Operational Efficiencies

One of the primary benefits of the Capacity Expansion Program is added operational flexibility which will allow BART to minimize expenses associated with vehicle maintenance and electric power. The completion of the KE Track in January 1986 was the first milestone for accomplishing this under the Capacity Expansion Program. The new mainline track and sidings in downtown Oakland have reduced car miles and related expenses as a result of its train storage capability.

The Daly City Turnback and Yard and C-cars provide for even greater operational efficiency. The Turnback, like the KE Track, accommodates the storage of trains during the midday and night, eliminating wasteful and unnecessary deadheading. The new C-cars enhance efficiency further by allowing for quick train sizing. Compared to current operations, this means that BART will have a much greater ability to provide train capacity in accordance with its load factor policy. In FY 1989/90, train lengths will be tailored to meet demand at a maximum average load factor of 1.15 during peak periods and 1.00 during the offpeak.

Figure 20

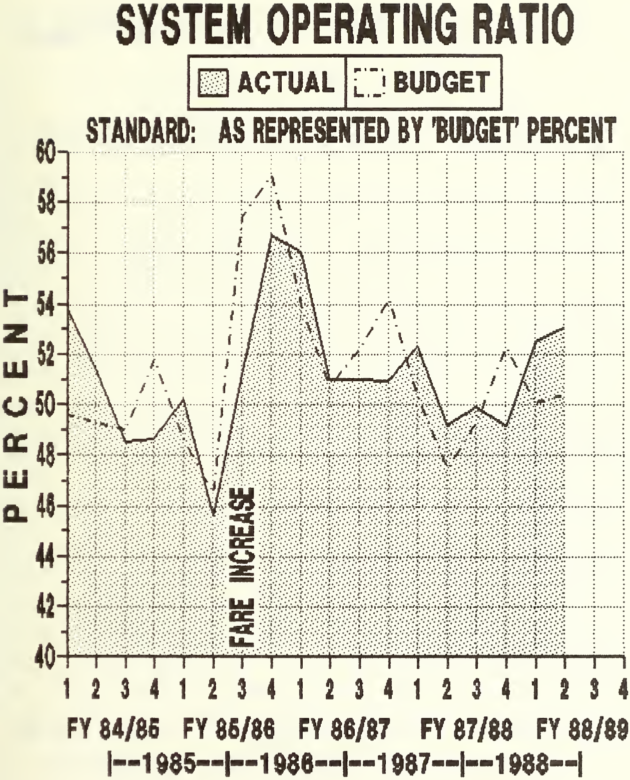
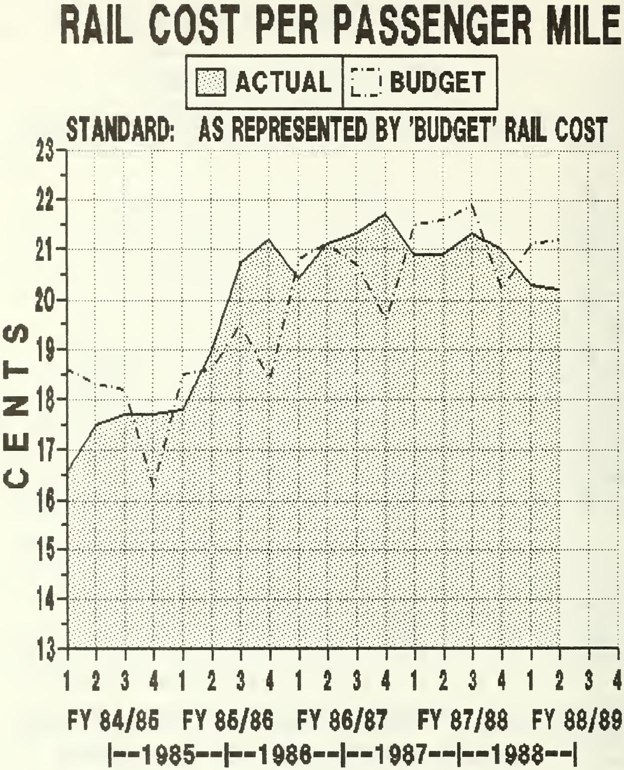

SYSTEM OPERATING RATIO
ACTUAL
BUDGET
STANDARD: AS REPRESENTED BY 'BUDGET' PERCENT
PERCENT
60
58
56
54
52
50
48
46
44
42
40
FARE INCREASE
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 84/85
FY 85/86
FY 86/87
FY 87/88
FY 88/89
|--1985--|--1986--|--1987--|--1988--|

Figure 21


RAIL COST PER PASSENGER MILE
▨ ACTUAL
⬚ BUDGET
STANDARD: AS REPRESENTED BY 'BUDGET' RAIL COST
CENTS
23
22
21
20
19
18
17
16
15
14
13
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
FY 84/85 FY 85/86 FY 86/87 FY 87/88 FY 88/89
|--1985--|--1986--|--1987--|--1988--|

While crucial to adding new service, the combination of the KE Track, Daly City Turnback and Yard, and C-cars also permits more service to be operated with the addition of less than proportional car miles. That's why over the next five years car miles are projected to increase by only 13%, compared to a 22% more cars required for service, and providing a maximum train frequency 53% higher than today.

Increase Labor Output

BART's strategy for promoting increased labor productivity is through the continuation of programs which have proven to be effective, and implementation of new programs for achieving even greater output. Key to this effort is BART's dedication to developing human resources through education and training, maintaining good relations, providing challenging work in a safe and pleasant environment, and affording opportunities for advancement. BART's Employee Relations Department will continue to play a key role in all of these areas. Further, efforts will also focus on achieving the objectives called for in BART's Affirmative Action Plan. The BART Board of Directors will be appraised on a regular basis of progress towards realizing the workforce representation objectives identified in the plan.

As part of its ongoing effort to improve productivity, BART will be promoting employee wellness through continued support for a variety of health care programs. Employees will be encouraged to take an active role in preventative health care, as well as making judicious use of paid sick leave.

Employee safety also impacts productivity. An unfavorably high industrial injury rate, discussed earlier, led to the development of the Comprehensive Mitigation Plan by BART's Safety Department. This Plan will be implemented in FY 1989/90 and progress will be closely monitored in terms of the number and rate for industrial injuries.

BART's projected staffing buildup over the next five years is based on new positions needed to support each successive service expansion. The achievement of increased levels of productivity minimizes the need for new positions and, hence, labor cost. Proposed staffing increases have been rigorously reviewed as have prior year budgeted positions. The results of this review are summarized in Figure 22 which identifies the number of BART positions for each of the next five fiscal years. Compared to the adopted budget for the 1988/89 fiscal year, 167 positions will be added over the next five years to meet BART's service requirements. This is a 7% increase in BART's workforce; people needed to place 33% more cars in service, operate 29% more trains, and provide a service frequency 53% higher than today. All of this is projected to generate a 32% increase for revenue, as discussed below.

Other operational efficiency measures for keeping costs in line will focus on key budget requirements. This includes BART express bus operations. This service will continue to be evaluated in terms of its productivity and efficiency, and appropriate revisions will be made to improve performance. The new contract with Laidlaw Transit Incorporated was a major step towards reducing express bus expense without degrading the service. Future agreements will continue to be negotiated on the basis of contractor performance, which will include specifications for key operating parameters including on-time performance (currently specified at 95%).

Figure 22

PROJECTED REQUIREMENTS FOR ADDITIONAL OPERATING STAFF POSITIONS*

		Incremental Positions as of June 30					
Department	Budget 88/89	89/90	90/91	91/92	92/93	93/94	5-Yea Increas
GENERAL MANAGER	5	0.0	0.0	0.0	0.0	0.0	0.
LEGAL	15	2.0	0.0	0.0	0.0	0.0	2.
FINANCE	109	2.0	2.0	9.0	1.0	1.0	15.
DISTRICT SECRETARY	4	1.0	0.0	0.0	0.0	0.0	1.
PUBLIC AFFAIRS	12	0.0	0.0	0.0	0.0	0.0	0.
SAFETY	13	(1.0)	0.0	0.0	0.0	1.0	0.
EMPLOYEE RELATIONS	48	(2.0)	0.0	0.0	0.0	0.0	(2.
AFFIRMATIVE ACTION	6	0.0	0.0	0.0	0.0	0.0	0.
PLANNING, BUDGET AND RESEARCH	18	0.0	0.0	0.0	0.0	0.0	0.
MATL MGMT & PROCUREMENT	72	5.0	0.0	0.0	0.0	0.0	5.
INFORMATION SYSTEMS	34	0.0	0.0	0.0	0.0	0.0	0.
ADMINISTRATIVE SERVICES	31	(3.0)	0.0	0.0	0.0	0.0	(3.
Total Admin. and Support Services	367.0	4.0	2.0	9.0	1.0	2.0	18.
ADMIN & MAINTENANCE SUPPORT	122	(1.0)	0.0	0.0	0.0	0.0	(1.0
COMMUNIC/COMPONENT REPAIR	160	5.0	0.0	0.0	3.0	3.0	11.0
ROLLING STOCK MAINTENANCE	353	34.0	0.0	0.0	0.0	0.0	34.0
POWER & WAY MAINTENANCE	477	45.0	10.0	2.0	0.0	0.0	57.0
ENGINEERING & CONSTRUCTION	53	(1.0)	0.0	0.0	0.0	0.0	(1.0
EXTENSION PROJECTS	0	3.0	0.0	0.0	0.0	0.0	3.0
Total Maintenance & Engineering	1,165.0	85.0	10.0	2.0	3.0	3.0	103.0
ADMIN, SUPP & ANALYSIS, BUS OPS	27	0.0	0.0	0.0	0.0	0.0	0.0
TRAIN OPERATIONS	326	7.0	9.0	0.0	0.0	2.0	18.0
STATION OPERATIONS	212.5	3.0	3.0	0.0	2.0	0.0	8.0
POLICE SERVICES	171.5	4.0	3.0	3.0	4.0	6.0	20.0
Total Field Services	737.0	14.0	15.0	3.0	6.0	8.0	46.0
Total Operations Departments	1,902.0	99.0	25.0	5.0	9.0	11.0	149.0
Total District	2,269.0	103.0	27.0	14.0	10.0	13.0	167.0
Cumulative Increase	--	103.0	130.0	144.0	154.0	167.0	

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* Includes part-time Train Operators, Station Agents, and Police Cadets at 1/2 position each

Does not include capitalized or otherwise reimbursable labor. Negative entries for FY89/9 generally reflect existing positions being converted from operating staff to reimbursable positions.

Expand BART's Revenue Base

With about 93¢ out of every revenue dollar currently coming to BART from passenger fares, certainly the most productive way of expanding revenues is to promote greater system use. BART's strategy for doing this was presented in Chapter One. Briefly, short-term efforts will focus on marketing BART service, making tickets easier to purchase, providing discount promotions in conjunction with special train service to major Bay Area events, and improving access to the system. Longer-term efforts are keyed to the implementation of system extensions which will effectively expand BART's market, adding riders and revenue.

The remaining portion of BART's revenue, presently about 7¢ out of every dollar, comes from sources other than passenger fares. These include income from: concessions, advertising, rents, fines, and interest. Activities for BART's Concessions and Property Management Program have been stepped up within the past few years. The realization of increasing revenues from the leasing of space in stations has fueled this new interest. This program, too, is expected to help increase ridership by making the system more attractive in terms of the services housed within stations. In addition to the current businesses located in stations (including flower shops, newspaper stands, dry cleaners, Federal Express facilities), BART plans on executing a concession permit with Host International by August 1989 for the establishment of gift and sundry shops at five stations.

Installation of ATM equipment in stations will also be pursued as a means of providing added convenience to BART riders and for increasing revenue through the rental of space in stations.

The Concessions and Property Management Program will continue to focus on recovering larger portions of operating expense by putting BART's assets to more productive use. Efforts will also focus on generating additional income through the sale and leasing of unproductive BART property.

WHAT IMPACT ON PRODUCTIVITY WILL THESE IMPROVEMENTS HAVE?

Implementation of projects to improve operational efficiency, along with programs to increase revenues while holding the line on expenses, will have a direct and favorable impact on financial performance as measured by BART's productivity and efficiency indicators. (The following percentages represent average annual compound growth rates as derived from line item projections for FY 1993/94 versus the FY 1988/89 budget. Refer to Figure 23 in Chapter Four.)

While labor input (as measured by equivalent employees) is projected to grow at an average rate of 1.8% annually over the next five years, vehicle miles are forecast to increase at an average annual rate of 2.6%. System resignaling will improve productivity by increasing train speeds. That's why vehicle hours are projected to increase 1.7% per year versus 2.6% for car miles.

The 2.9% average annual growth in demand is projected to exceed the growth for labor input (ie, equivalent employees) and service output (ie, car hours and car miles). This rate of ridership growth includes the impact of assumed rail fare increases of 5% in July 1991, 3% in July 1992, and 5% in July 1993. These increases put rail revenue growth on par with the increase in total operating expense, both of which are projected to rise 5.8% annually over the next five years. Much of this gain on the expense side is associated with the phasing in of higher service levels.

Productivity gains are also slated for express bus operations. Expense for this service is forecast to increase by an average of 0.8% per year over the next five years versus an annual increase of 4.3% for express bus revenue.

In terms of BART's productivity indicators, the rail farebox ratio is targeted at 51.9% in FY 1989/90, and dipping to 49.7% by FY 1993/94. The farebox ratio for express bus operations is budgeted at 11.7% in FY 1989/90, and rising to 12.7% by FY 1993/94. The system farebox ratio reflects the lower express bus component. In FY 1989/90 it's targeted at 48.0%, holding steady through FY 1992/93, and dipping to 46.4% in FY 1993/94.

BART's operating ratio is slated to be 51.2% in FY 1989/90, dipping 1.9 percentage points by FY 1993/94 to 49.3%.

The rail cost per passenger mile is projected to increase at an average annual rate of 3.0% over the next five years relative to a FY 1988/89 budgeted level of 21.4¢. Rail cost per passenger mile is forecast to decrease the first year to 21.0¢ in FY 1989/90, and then rise slowly each successive year to 24.9¢ for FY 1993/94. This increase reflects the difference in the average annual growth rates for rail expense, at 6.0%, versus 2.9% for passenger miles.

CHAPTER FOUR:

FIVE YEAR FINANCIAL PLAN

- FY 1989/90 Operating Budget
- Five Year Operating Budget Plan Elements
- Financial Capacity Analysis
- Capital Program Overview

Provision of existing and expanded service depends on a sound financial structure, both for operations and capital improvements. Based on the foregoing performance objectives for the five year period, it is the purpose of this chapter to identify the financial requirements of the service plan and implementation of proposed improvements, to highlight problems, and to recommend feasible solutions as a part of the five year plan.

FY 1989/90 OPERATING BUDGET

The adopted FY 1989/90 operating budget has been developed to meet BART's goals and objectives. This budget is summarized in Figure 23 along with actual figures for FY 1987/88, FY 1988/89 budget, FY 1988/89 estimated actual and projections for the upcoming five year period. Year-to-year comparisons presented below are in terms of the adopted FY 1988/89 budget.

The budget for FY 1989/90 anticipates net fare revenues of $86.3 million with a rail farebox ratio of 51.9%, and other operating revenues of $5.6 million, resulting in an operating ratio of 51.2%.

Property tax receipts are estimated at $9.4 million, and sales tax receipts are forecast at $105.4 million.

Operating expenses are anticipated to increase by $5.1 million (2.9%) from the FY 1988/89 budget to $179.7 million for FY 1989/90.

Net labor cost is expected to increase only $1.1 million (0.9%), reflecting an increase in staffing and an offsetting reduction in fringe benefit cost. The budget includes the cost of a net increase of 98 new full-time operating positions. Ten additional part-time train operators were also added, bringing the full-time equivalent operating positions to 103. Of these, 64 will support new service and 34 will be for improvements to current service.

Labor cost savings will result because the District will not be required by the Public Employee Retirement System to make the employer contribution to the fund. In the budget, but not in the operating expense, is a net increase of 44 new capitally funded or reimbursable full-time positions to support C-car warranty work, extensions, and other capital projects.

The cost of the express bus and shuttle program is expected to decrease by $0.6 million, reflecting a full year's cost under a new contract with Laidlaw Transit, a private firm, which began in January 1989. Transfer payments to AC Transit are expected to cost $6.7 million. In accordance with the regional transit financial planning agreement among BART, the two other major transit operators and MTC, transfer payments will also be made to MUNI for $1.5 million.

Traction and station power cost is expected to be $1.4 million more than the cost budgeted for FY 1988/89. Other non-labor expense is expected to increase by $2.5 million. Expected receipts of financial assistance through MTC of $0.1 million SB-1335 (STA) and $0.4 million TDA funds are budgeted.

As called for in last year's Five Year Plan, certain capital expenditures are also to be funded from operating sources. Capital allocations totalling $14.2 million are budgeted, including improvement allowance ($2.5 million), joint

Figure 23

FIVE-YEAR OPERATING BUDGET FORECAST, 89/90-93/94;
FARE INCREASES ASSUMED: 5% 7/1/91; 3% 7/1/92; 5% 7/1/93

F I V E Y E A R B U D G E T S U M M A R Y

	Actual 87/88	Budgeted 88/89	Estimated Actual 88/89	Adopted Budget 89/90	Projected 90/91	Projected 91/92	Projected 92/93	Projected 93/94
REVENUE ($000)								
Net Rail Revenue, Including Fare Increases	$77,756	$80,718	$81,726	$85,512	$88,333	$94,700	$100,277	$107,457
Express Bus Revenue, " " "	719	740	740	748	765	816	858	914
Net Passenger Revenue	78,475	81,458	82,466	86,259	89,098	95,516	101,135	108,371
Interest Revenue	3,677	2,994	3,411	2,854	2,799	2,766	2,737	2,693
Other Revenue	1,971	2,491	2,491	2,798	2,927	3,580	4,010	4,000
Other Operating Revenue	5,648	5,485	5,902	5,652	5,726	6,346	6,747	6,693
Net Operating Revenue	84,123	86,943	88,368	91,912	94,823	101,861	107,882	115,064
EXPENSES ($000)								
Net Labor	116,064	121,877	120,877	123,007	128,973	136,271	144,514	162,897
Electric Power	14,709	16,555	15,727	17,996	19,430	20,812	22,268	23,829
Other Non-Labor	21,236	21,347	20,347	23,823	24,915	26,481	28,084	29,381
Express Bus	8,455	6,984	6,984	6,405	6,405	6,405	6,405	7,268
DART Shuttles	228	314	314	278	291	306	321	337
Bus Operator Transfer Subsidies	7,083	7,502	7,502	8,177	8,569	8,997	9,447	9,919
Total Operating Expenses	167,775	174,579	171,752	179,684	188,582	199,271	211,039	233,631
OPERATING DEFICIT ($000)	(83,652)	(87,636)	(83,384)	(87,773)	(93,759)	(97,410)	(103,156)	(118,567)
FINANCIAL ASSISTANCE ($000)								
Property Tax Revenues	8,226	8,581	8,740	9,352	9,819	10,310	10,826	11,367
Sales Tax Revenues (BART 75% Share)	92,243	96,792	100,417	105,358	110,626	116,157	121,965	128,063
TDA ('BART Only')	348	370	370	413	434	456	478	502
STA, Other State Funds	77	293	293	67	67	67	67	67
Section 9 Operating Assistance			339					
Debt Service Allocations	(12,594)	(14,502)	(14,502)	(14,518)	(14,578)	(14,644)	(14,704)	(14,767)
Capital and Other Allocations	(4,708)	(4,017)	(12,272)	(14,181)	(14,283)	(14,936)	(15,475)	(6,665)
Total Financial Assistance	83,592	87,517	83,384	86,491	92,085	97,410	103,157	118,567
NET FINANCIAL RESULT ($000)	(60)	(119)	0	(1,282)	(1,674)	0	0	0

Figure 23 (Continued)

FIVE-YEAR OPERATING BUDGET FORECAST, 89/90-93/94;
FARE INCREASES ASSUMED: 5% 7/1/91; 3% 7/1/92; 5% 7/1/93

PERFORMANCE INDICATORS AND CAPITAL ALLOCATIONS DETAIL

	Actual 87/88	Budgeted 88/89	Estimated Actual 88/89	Adopted Budget 89/90	Projected 90/91	Projected 91/92	Projected 92/93	Projected 93/94
FINANCIAL INDICATORS								
Annual Patronage, Linked (000)	57,596	59,370	59,889	62,375	64,429	65,784	67,630	69,021
Annual Patronage, Unlinked (000)	61,738	63,658	64,215	66,881	69,083	70,537	72,516	74,008
Annual Patronage Growth (Includes Fare Change)		3.1%	4.0%	4.2%	3.3%	2.1%	2.8%	2.1%
Annual Passenger Miles (000)	722,583	746,173	752,694	783,668	809,326	826,355	849,535	867,019
Annual Vehicle Hours (000)	1,148	1,165	1,165	1,318	1,216	1,214	1,247	1,269
Annual Vehicle Miles (000)	31,393	31,918	31,918	34,694	34,012	34,655	35,587	36,228
Equivalent Employees (Operations)	1,924	1,989	1,973	2,136	2,160	2,177	2,186	2,198
Fare Box Ratio: Rail Only	51.2%	50.5%	52.1%	51.9%	51.0%	51.6%	51.5%	49.7%
Fare Box Ratio: Express Bus Service	8.5%	10.6%	10.6%	11.7%	12.0%	12.8%	13.5%	12.7%
Fare Box Ratio: Total System	46.8%	46.7%	48.0%	48.0%	47.2%	47.9%	47.9%	46.4%
Operating Ratio	50.1%	49.8%	51.5%	51.2%	50.3%	51.1%	51.1%	49.3%
Rail Cost Per Passenger Mile	$0.210	$0.214	$0.209	$0.210	$0.214	$0.222	$0.229	$0.249
Vehicle Miles per Equivalent Employee	16,314	16,047	16,180	16,240	15,745	15,921	16,283	16,484
System Utilization Ratio (Pass. Mi./Seat Mi.)	32.0%	32.5%	32.8%	31.4%	33.0%	33.1%	33.2%	33.2%
TDA INDICATORS								
Rail Cost Per Vehicle Hour	$132.40	$137.15	$134.72	$125.09	$142.58	$151.18	$156.28	$170.26
Rail Cost Per Linked Revenue Passenger	$2.64	$2.69	$2.62	$2.64	$2.69	$2.79	$2.88	$3.13
Linked Revenue Passengers Per Vehicle Mile	1.83	1.86	1.88	1.80	1.89	1.90	1.90	1.91
Linked Revenue Passengers Per Vehicle Hour	50.17	50.96	51.41	47.34	53.00	54.18	54.24	54.38
Vehicle Hours Per Equivalent Employee	596.6	585.7	590.6	616.8	562.7	557.8	570.5	577.5
CAPITAL AND DEBT SERVICE ALLOCATIONS ($000)								
Revenue Bond Debt Service	12,595	14,502	14,502	14,518	14,578	14,644	14,704	14,767
Improvement Allowance	3,100	1,500	1,500	2,500	2,600	2,700	2,800	2,900
Extension Planning	0	488	488	1,307	1,211	1,276	1,350	1,450
Other Planning	670	1,377	1,377	1,675	1,761	1,853	1,956	2,081
Joint Development	938	652	652	200	210	219	223	216
Transfers to Capital	0	0	8,255	8,500	8,500	8,889	9,146	18
Total Capital and Debt Service Allocations	(17,303)	(18,519)	(26,774)	(28,699)	(28,861)	(29,580)	(30,179)	(21,432)

development ($0.2 million), extension planning ($1.3 million), and other capital project support ($1.7 million). Included in the budget is the recommendation that the $8.5 million PERS savings be set aside for a capital allocation to help fund the extensions program, especially with regard to future start-up costs. The operating budget will also fund debt service allocations of $14.5 million for the revenue bond debt service.

After these allocations have been budgeted, total operating uses exceed sources by $1.3 million.

FIVE YEAR OPERATING BUDGET PLAN ELEMENTS

Over the five year period, labor cost is anticipated to constitute 69% of BART's operating budget, with the remaining 31% for non-labor items. The operating budget plan in Figure 23 includes two components of labor expense, the base necessary to maintain current service and needed additions for expanded service.

Non-labor expense also reflects funds for both current and expanded service. It is comprised of two major items, electric power and purchased transportation (express bus, shuttle and feeder service), and a variety of other lesser items.

The power cost associated with providing the current level of service is expected to increase by an average of 6.5% annually from the first through the fifth year of the plan. Scheduled Diablo Canyon rate increases and fuel price levels, together with the availability of electric power from alternate sources, will impact future BART power cost estimates. Alternate sources of power are being evaluated and future cost projections may be affected.

All other non-labor expense items are expected to increase by an average of 4.9% annually to maintain current service. This rate approximates the projected annual increase in the CPI. Actual increases are greater due to the additional service planned.

Projected BART passenger growth was documented above in Figure 9 (see Chapter One). For financial planning purposes, a 15.0% fare increase beginning July 1991 was assumed at the start of this plan update. This increase is less than the projected growth in the CPI since the previous increase in January 1986. After evaluating updated five-year costs projections, it was clear that a 15% increase in July 1991 would not be needed if other cost and revenue estimates are realized. Accordingly, the financial plan now reflects budget balancing fare increases in the last three years of 5%, 3% and 5%, respectively. Other operating revenue includes interest on investment of operating funds as well as advertising and concession revenue.

For the upcoming five year period, BART's sources of financial assistance are forecast to grow at somewhat higher rates than were assumed in last year's plan, reflecting continuing economic growth. Sales tax yields are projected to expand by 8.8% in FY 1989/90, and 5% each year thereafter. This is based, in part, on the projected statewide growth forecast by the Commission on State Finance, as adjusted for historically lower growth in the three BART counties. Property tax revenues are expected to increase by 9.0% in FY 1989/90 and 5% each year thereafter.

Discretionary financial assistance, which is allocated to BART by MTC, is based on the preliminary allocation estimate furnished earlier this year. This estimate calls for only $0.1 million of STA funds and $0.4 million of TDA funds. For purposes of the current financial plan, TDA funds are expected to grow at the rate indicated above for BART sales tax revenues. Due to uncertainty about the continuation of the STA program, funds projected from this source for subsequent years are expected to remain at the level budgeted for FY 1989/90.

According to the projections in Figure 23, the five year financial outlook is for small managable deficits in the first two years followed by balanced budgets, assuming that fares are increased as noted above. The plan assumes that the revenue bond debt service requirements will be funded each year by an allocation from the operating budget. This and other debt service requirements are summarized in Figure 24.

FINANCIAL CAPACITY ANALYSIS

The information contained in the 1988 Five Year Plan was utilized by the Metropolitan Transportation Commission in an analysis of the financial capacity of all transit operators in this region. Based on this analysis, MTC determined that BART has the financial capacity to carry out its current operating and capital plans. An update of this analysis based on operator data for 1989 will be conducted by MTC.

CAPITAL PROGRAM OVERVIEW

The implementation of BART's capital program will require $2,908 million. Of the total amount, 40% ($1,150 million) will be required for replacements and improvements to the current 71-mile system, and 60% ($1,758 million) for system extensions. Note that these estimates are in current dollars except for extensions which are in 1987 dollars.

Replacements and improvements to the current system consist of three groups of projects: capacity expansion, basic system, and access. Current capacity expansion program projects will require 17% ($488 million) of BART's total capital program funding requirements. All but 0.4% ($2 million) of the needed funds for capacity expansion have been secured.

Basic system improvements -- projects which maintain the current system infrastructure, safety, and enhance efficiency -- are projected to cost $445 million, or 15% of all identified capital expense. Just under one-half this amount ($217 million), all of which is currently unfunded, will be required for 145 new revenue vehicles required to support basic system operations once extensions are brought on line. Basic system projects are currently 42% ($189 million) funded. The unfunded portion of basic system projects, 58% ($256 million), is largely programmed for FY 1993/94 with federal funds for the procurement of the 145 new vehicles.

Figure 24

FIVE YEAR PLAN DEBT SERVICE SUMMARY
(Thousands of Dollars)

	ACTUAL	BUDGET	ADOPTED BUDGET	FORECAST			
	FY 87/88	FY 88/89	FY 89/90	FY 90/91	FY 91/92	FY 92/93	FY 93/94
Debt Service Expense							
General Obligation Bond Interest Redemption	54,737	55,311	55,443	47,189	47,096	46,972	46,743
SSD #1 Bond Interest and Redemption	736	736	735	733	730	735	730
Revenue Bond Debt Service	12,595	14,505	14,518	14,578	14,644	14,704	14,767
Total Debt Service Requirements	68,068	70,552	70,696	62,500	62,470	62,411	62,240
Sources of Funds							
General Obligation Bond Interest and Redemption Fund	54,737	55,311	55,443	47,189	47,096	46,972	46,743
SSD #1 Bond Interest and Redemption Fund	736	736	735	733	730	735	730
Allocation from Operating Budget for Revenue Bond Debt Service	12,595	14,505	14,518	14,578	14,644	14,704	14,767
Total Sources of Funds	68,068	70,552	70,696	62,500	62,470	62,411	62,240

Capital projects in BART's access improvement program will provide for the addition of 10,633 new parking spaces over the next five years. This will require $217 million, or 7% of BART's total capital program funding. Access projects are currently 27% ($58 million) funded and 73% ($159 million) unfunded.

Implementation of the first phase extensions and related work will require $1,758 million, or 60% of BART's currently identified capital funding requirements. This includes $125 million for phase II planning/right-of-way and extensions contingency. A federal commitment for $445 million is being sought as a key element in this program's funding.

GLOSSARY

AB-842 PROCESS: State mandated annual financial planning process involving BART, AC Transit, MUNI, and MTC; for the purpose of minimizing budget deficits and allocating the 25% share of the 1/2¢ sales tax in the BART District counties.

A-CAR: A train control equipped vehicle which may be used as the first and last car on each train.

AFC: Automatic fare collection equipment including entry/exit gates, ticket vendors, change machines, etc. Performance is measured in terms of the number of equipment problems which cannot be corrected by station agents per 1,000 passenger trips.

AVERAGE WEEKDAY: Having typical commute day characteristics. Used as the basis to compare actual versus forecast patronage.

BALANCE OF PEAK PERIOD TRAIN CYCLE (also see PEAK TRAIN CYCLE): A unit of time used to define the "shoulder" period occurring just before and after the peak one hour. A 2-hour and 27-minute train cycle less the one-hour peak.

BART EXPRESS BUS SERVICE: BART funded bus service linking outlying East Bay communities to the rail system. This service is provided through a purchase of service agreement.

B-CAR: A vehicle which does not contain train control equipment and is used in conjunction with A- or C-cars to form a train. A BART train may contain up to 8 B-cars.

CAPACITY EXPANSION PROGRAM: BART's strategy for increasing service and capacity which has focused on the implementation of about 12 key capital projects since the early 1980s.

CAPITAL IMPROVEMENT PROGRAM (CIP): A companion document to the Five Year Plan which identifies all of BART's capital projects and the financial plan for their implementation.

CAR AVAILABILITY: A percentage derived by the number of cars available for service divided by the number of cars in BART's operating fleet.

CAR HOUR: One vehicle (A-, B-, or C-car) in service for a period of one hour.

CAR MILE: One vehicle (A-, B-, or C-car) which travels a distance of one mile.

C-CAR: A second generation transit vehicle developed as part of BART's Capacity Expansion Program which can be used as a leading/trailing or a mid-train car.

CONSIST: Used interchangeably with train.

DEADHEAD: Mainline train movements which do not provide passenger service and are non-revenue generating.

DELAY EVENT: Any occurrence which causes one or more trains to be delayed. Beginning in FY 1988/89, the District's monitoring program is conducted using a five minute delay threshold.

DISCOUNT TICKET: A BART ticket which sells for less than the magnetically stored face value. Discounts range from 6.25% for high value regular adult tickets to 90% for children 5-12 and adults 65 years of age and older, and qualifying handicapped persons.

ELEVATOR/ESCALATOR AVAILABILITY: The ratio expressed as a percentage of the number of hours units are actually in service to the maximum possible unit-hours during the time the system is open for business.

EMERGENCY PLAN EXERCISE: Exercises coordinated and conducted by BART in cooperation with emergency service providers for the purpose of minimizing response times through familiarization of the system.

EMPLOYEE LOST-TIME INJURY: Any injury which results in the loss of one 8-hour work shift or more. Lost time as a result of an industrial injury may occur in the same quarter as the injury itself, or in later quarters as for many long-term disabilities.

EMPLOYEE LOST-TIME RATE: The ratio, expressed as a percent, of lost-time hours to total hours worked.

EMPLOYEE PAID SICK LEAVE RATE: The percentage of paid sick leave hours to paid straight-time hours.

EQUIVALENT EMPLOYEE: A unit of labor based on 2,000 hours worked annually, excluding all capitalized or otherwise reimbursed hours.

FAREBOX RATIO: The percentage of net passenger revenue (gross passenger revenue less special fare discounts and other deductions) of total operating expenses. Rail farebox ratio excludes revenue and expense for BART funded bus operations.

FAST PASS: A monthly pass valid for unlimited travel within San Francisco on BART and MUNI.

GOAL: A desired state toward which efforts are directed.

HEADWAY: The time interval between trains, usually expressed in minutes and seconds, which defines a level of service.

JOINT DEVELOPMENT: A cooperative land-use planning and implementation program which seeks to develop station areas into multi-use activity centers where people have an alternative to automobile travel.

KEY PERFORMANCE INDICATOR: High-level performance measures selected on the basis of best overall indication of train service quality, fare equipment dependability, patron response, and financial performance.

LOAD FACTOR: The ratio of on-board passengers to seats. An index of train occupancy, usually measured at a maximum load point.

MAXIMUM LOAD POINT: The point on each train route through which the train passes with the highest number of passengers during a given unit of time in one direction.

OFFPEAK PERIOD: All revenue service times other than during weekday morning and afternoon peak train cycles.

OFF-SITE TICKET SALES OUTLET: Participating banking institutions, businesses, and social service agencies which sell BART high value and discount tickets.

OPERATING RATIO: The percentage of total net passenger and other operating revenues of total operating expenses.

PASSENGER MILE: One passenger traveling a distance of one mile.

PATRON ACCIDENT: A filed report of an injury to a patron having occurred on board trains, in station areas, or on other District property. The District's accident rate is expressed as the ratio of reported incidents related to train operations and stations per million passengers carried.

PATRON ON-TIME PERFORMANCE: A measure of service quality reflecting, as a percentage, the ratio of patron trips on time (arrival within 5 minutes of normal time) to total trips for all days. The published timetable is offset one minute earlier than the normal train arrival times.

PEAK HOUR: A 60-minute interval during which time patronage is at its maximum.

PEAK PERIOD: An interval of time consisting of the peak one hour plus the "shoulder" demand periods both before and after the peak hour.

PEAK TRAIN CYCLE: The period of time during which all vehicles available for peak service pass a given point on the system (for load factor monitoring this period is defined as 2 hours and 27 minutes).

PROGRAM AREA: Functional areas of the organization which reflect the concerns expressed in BART's mission statement and goals.

PROGRAM OBJECTIVE: Directive which focuses on the implementation of higher level capital projects and/or activities by specified completion dates.

RAIL COST PER PASSENGER MILE: A financial indicator measured by the ratio of rail operating expense (total operating expense less express bus and shuttle bus costs) for a given period to the number of passenger miles carried on the rail system during the same period.

RELIABILITY IMPROVEMENT PROGRAM (RIP): A program completed in the early 1980s which focused on modifying key components to bring performance to within acceptable standards.

SYSTEM UTILIZATION: A measure of system efficiency as derived by the ratio of passenger miles to seat miles. Equivalent to an average system load factor or average rate of seat occupancy.

THROUGHPUT: The number of cars, trains, or passengers passing a point on the system during a given unit of time in one direction.

BART FARE COMPONENTS AND TICKET PRICES
(As of June 1989)

TRIP LENGTH:	Up to 6 miles	$0.80	
	Between 6 and 14 miles[1]	$0.92 + $0.069/Mile	
	Over 14 miles	$1.47 + $0.041/Mile	
SURCHARGE:	Transbay	$0.45	
	Daly City[2]	$0.52	
SPEED PREMIUM:	Charge differential for faster or slower than average trips, based on scheduled travel time	+/- $0.025/Minute	
RESULTING FARES:[3]	Range	$0.80 to $3.00	
	Average[4]	$1.70	
SPECIAL FARES:[5] & DISCOUNTED TICKETS:	Children under 5 (No Charge)	$0.00	
	Children 5 through 12 (90% discount)	$1.60	($16.00 Value
	Persons 65 and over (90% discount)	$1.60	($16.00 Value
	Qualifying handicapped (90% discount)	$1.60	($16.00 Value
	Regular adult (6.25% discount)	$30.00	($32.00 Value
	Excursion (entry/exit, same station)	$2.60	
SEMIMONTHLY PASS:[6]	BART ticket combined with AC Transit Semimonthly Pass (unlimited AC use)	8 denominations from $20.00 to $53.00	
MONTHLY PASS:[7]	Unlimited monthly BART/MUNI travel within San Francisco	$28.00	
EXPRESS BUS: (1 Zone/2 Zone)	Children under 5 (no charge)	$0.00	
	Children 5 through 12	$0.15/$0.30	
	Regular adult	$0.75/$1.15	
	Persons 65 and over	$0.15/$0.30	
	Qualifying handicapped	$0.15/$0.30	
TRANSFERS:[8]	BART Express Bus (leaving rail station)	$0.75 Value	
	SF MUNI (per MUNI round trip)	$0.85 Value	
	CCC Transit Authority (leaving rail station)	$0.35 Value	
	AC Transit (per AC round trip) -- Peak[9]	$0.70 Value	
	Off-peak	$0.90 Value	

NOTES:

1. Trips over 6 miles within East Bay Suburban Zone (Concord-Orinda, Fremont-Bay Fair, Richmond-Ashby) priced at fare indicated for trips under 6 miles.
2. Does not apply to transbay trips.
3. Resulting fares are rounded to nearest 5¢ and encoded in automatic fare collection equipment.
4. Weighted by all BART-ticketed trips (excludes BART/MUNI Fast Pass trips) which average 13.9 miles.
5. Discounted multiple-ride tickets are sold at off-site BART ticket outlets and are not available from station ticket vending machines.
6. Includes last ride bonus feature on BART which allows any trip if remaining balance equals 5¢. Demonstration program effective February 1987.
7. The BART/MUNI Fast Pass is available at all San Francisco MUNI pass outlets.
8. In addition to those shown, transfers are also available for transit services which connect with BART but operate primarily outside the three-county BART District.
9. Weekdays 6 - 9 a.m. and 4 - 7 p.m.

BART FARES ($) AND TRAVEL TIMES (minutes)

Fares

Time

Daly City	1.30	1.30	1.30	1.30	1.45	1.45	1.45	1.45	1.85	2.85	2.70	2.60	2.45	2.25	2.00	2.35	2.25	2.15	2.10	2.05	2.00	1.95	1.90	1.90	1.90	2.05	2.15	2.25	2.35	2.50	2.65	2.85	3.00
5	Balboa Park	0.80	0.80	0.80	0.80	0.80	0.80	0.80	1.75	2.80	2.60	2.55	2.40	2.20	1.95	2.30	2.20	2.10	2.00	2.00	1.95	1.90	1.85	1.85	1.85	2.00	2.05	2.20	2.30	2.45	2.60	2.80	2.95
7	3	Glen Park	0.80	0.80	0.80	0.80	0.80	0.80	1.70	2.80	2.60	2.50	2.35	2.15	1.90	2.25	2.15	2.10	2.00	1.95	1.90	1.85	1.80	1.80	1.80	1.95	2.05	2.15	2.30	2.40	2.55	2.75	2.95
10	6	4	24th St. Mission	0.80	0.80	0.80	0.80	0.80	1.55	2.70	2.50	2.45	2.30	2.10	1.85	2.20	2.10	2.00	1.90	1.90	1.85	1.75	1.65	1.65	1.65	1.85	1.95	2.10	2.20	2.35	2.50	2.70	2.85
13	8	6	3	16th St. Mission	0.80	0.80	0.80	0.80	1.55	2.70	2.50	2.45	2.25	2.10	1.80	2.15	2.05	2.00	1.90	1.85	1.80	1.70	1.60	1.60	1.60	1.80	1.95	2.10	2.20	2.30	2.45	2.70	2.85
15	11	9	5	3	Civic Center	0.80	0.80	0.80	1.40	2.65	2.45	2.40	2.25	2.05	1.75	2.10	2.00	1.95	1.85	1.80	1.75	1.60	1.55	1.55	1.55	1.75	1.90	2.05	2.15	2.30	2.40	2.65	2.80
17	13	10	7	5	2	Powell	0.80	0.80	1.40	2.65	2.45	2.40	2.25	2.05	1.75	2.10	2.00	1.95	1.85	1.80	1.75	1.60	1.55	1.55	1.55	1.75	1.90	2.05	2.15	2.30	2.40	2.65	2.80
19	15	12	9	7	4	2	Montgomery	0.80	1.40	2.65	2.45	2.40	2.25	2.05	1.75	2.10	2.00	1.95	1.85	1.80	1.75	1.60	1.55	1.55	1.55	1.75	1.90	2.05	2.15	2.30	2.40	2.65	2.80
21	16	14	11	8	6	4	2	Embarcadero	1.40	2.65	2.45	2.40	2.25	2.05	1.75	2.10	2.00	1.95	1.85	1.80	1.75	1.60	1.55	1.55	1.55	1.75	1.90	2.05	2.15	2.30	2.40	2.65	2.80
28	24	21	18	16	13	11	10	8	West Oakland	1.90	1.70	1.65	1.45	1.15	0.80	1.35	1.20	1.10	0.95	0.85	0.80	0.80	0.80	0.80	0.80	0.80	0.95	1.15	1.35	1.50	1.65	1.90	2.05
68	63	61	57	55	53	51	49	47	40	Concord	0.80	0.80	0.80	0.80	1.75	2.10	2.00	1.95	1.85	1.85	1.80	1.80	1.85	1.85	1.85	1.90	2.00	2.15	2.25	2.35	2.50	2.75	2.90
62	57	54	51	49	46	45	43	41	34	7	Pleasant Hill	0.80	0.80	0.80	1.55	1.95	1.85	1.75	1.65	1.65	1.60	1.60	1.65	1.65	1.65	1.70	1.80	1.95	2.05	2.20	2.30	2.55	2.70
58	54	51	48	46	43	41	40	38	30	10	4	Walnut Creek	0.80	0.80	1.40	1.85	1.75	1.70	1.60	1.55	1.55	1.55	1.55	1.55	1.55	1.65	1.75	1.85	2.00	2.10	2.25	2.45	2.65
53	49	46	43	41	38	36	35	33	25	15	9	6	Lafayette	0.80	1.15	1.70	1.60	1.50	1.45	1.40	1.30	1.25	1.35	1.35	1.35	1.50	1.55	1.70	1.80	1.95	2.10	2.30	2.45
48	43	41	37	35	33	31	29	27	20	21	14	11	6	Orinda	0.80	1.50	1.40	1.30	1.15	1.10	1.00	0.80	1.05	1.05	1.05	1.20	1.40	1.55	1.65	1.75	1.90	2.15	2.30
41	37	34	31	29	26	25	23	21	14	27	21	17	12	7	Rockridge	1.20	1.05	0.90	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.85	1.00	1.20	1.40	1.55	1.65	1.90	2.05
59	55	52	48	46	43	41	40	38	30	51	45	42	37	31	25	Richmond	0.80	0.80	0.80	0.80	0.80	1.20	1.30	1.30	1.30	1.45	1.55	1.65	1.80	1.90	2.05	2.30	2.45
55	50	47	44	42	39	37	35	34	26	47	41	38	33	27	21	5	El Cerrito Del Norte	0.80	0.80	0.80	0.80	1.00	1.10	1.10	1.10	1.35	1.45	1.60	1.70	1.80	1.95	2.20	2.35
51	47	44	41	38	36	34	32	30	23	44	38	35	30	24	18	8	4	El Cerrito Plaza	0.80	0.80	0.80	0.90	1.00	1.00	1.00	1.20	1.35	1.50	1.60	1.75	1.90	2.10	2.25
48	43	40	37	35	32	30	28	27	19	40	34	31	26	20	14	12	7	4	North Berkeley	0.80	0.80	0.80	0.80	0.80	0.80	1.05	1.20	1.40	1.50	1.65	1.80	2.00	2.15
45	40	38	34	32	29	27	26	24	16	37	31	28	23	17	11	15	10	7	3	Berkeley	0.80	0.80	0.80	0.80	0.80	1.00	1.15	1.35	1.50	1.65	1.75	2.00	2.15
42	38	35	31	29	26	25	23	21	13	34	28	25	20	14	8	17	13	10	6	3	Ashby	0.80	0.80	0.80	0.80	0.90	1.05	1.30	1.45	1.60	1.75	1.95	2.10
38	34	31	28	26	23	21	19	18	10	30	24	21	16	10	4	21	17	14	10	7	4	MacArthur	0.80	0.80	0.80	0.80	0.95	1.20	1.35	1.55	1.65	1.90	2.05
34	30	27	24	22	19	17	16	14	7	34	28	25	20	14	8	25	20	17	13	11	8	4	19th St. Oakland	0.80	0.80	0.80	0.80	1.10	1.25	1.50	1.60	1.85	2.00
32	28	26	22	20	18	16	14	12	5	36	29	26	21	16	9	26	22	19	15	12	10	6	2	Oak. City Ctr. 12th St.	0.80	0.80	0.80	1.10	1.25	1.50	1.60	1.85	2.00
33	29	26	23	21	18	16	15	13	5	39	33	30	25	19	12	30	25	22	18	16	13	9	6	4	Lake Merritt	0.80	0.80	1.10	1.25	1.50	1.60	1.85	2.00
38	34	31	28	26	23	21	19	18	10	43	37	34	29	23	17	34	30	26	23	20	17	13	10	8	5	Fruitvale	0.80	0.80	1.05	1.25	1.50	1.70	1.90
42	37	35	31	29	27	25	23	21	14	47	41	38	33	27	20	37	33	30	26	23	20	17	13	11	8	4	Coliseum	0.80	0.80	1.10	1.35	1.65	1.80
46	41	39	35	33	31	29	27	25	18	51	45	42	37	31	24	42	37	34	30	28	25	21	17	16	12	8	5	San Leandro	0.80	0.80	1.10	1.45	1.65
50	45	43	40	37	35	33	31	30	22	55	49	46	41	35	29	46	41	38	34	32	29	25	21	20	16	12	9	5	Bay Fair	0.80	0.80	0.80	0.80
55	50	47	44	42	40	38	36	34	27	59	53	50	45	39	33	50	46	42	39	36	33	29	26	24	21	16	13	9	5	Hayward	0.80	0.80	0.80
59	54	52	48	46	44	42	40	38	31	63	57	54	49	44	38	54	50	47	43	40	37	33	30	29	25	21	17	13	9	5	South Hayward	0.80	0.80
64	59	57	54	52	49	47	46	44	36	69	63	60	55	49	43	60	55	52	48	45	43	39	35	34	30	26	23	18	14	10	6	Union City	0.80
69	65	62	59	56	54	52	50	49	41	74	68	65	60	54	48	64	60	57	53	50	47	44	40	38	35	31	27	23	19	15	11	5	Fremont

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BART FACTS
FISCAL YEAR 1988/1989 DATA
(JULY 1988 - JUNE 1989)

FARES

Regular Adult: Rail fares are largely based on a distance formula ranging from 80¢ to $3.00. The face value for the average BART trip in FY 1988/89 was $1.55, including all MUNI Fast Pass trips at full value (80¢). The actual net average fare paid was $1.38, reflecting an 11% discount for the rail system. Regular express bus fares are 75¢ and $1.15 for one and two zone rides, respectively; rail patrons transferring to an express bus may obtain a free transfer worth 75¢.

Discounts: A maximum 6.25% rail fare discount is provided through the sale of $32 tickets for $30. Rail fares for handicapped persons, students 5-12 years of age, and persons 65 years of age and older are 10% of the regular adult fares. Children under 5 can ride free. Other discounts are provided through specially priced passes and/or ticket books for travel on BART express buses, San Francisco MUNI, and AC Transit.

Transfers: Free transfers can be made between all BART trains. Special agreements between BART and most other Bay Area operators permit up to a 50% discount for connecting transit service (on a round-trip basis).

PATRONAGE

Average Weekday: BART patronage averaged 207,231 trips per weekday in FY 1988/89. Of these trips, 101,319 (48.9%) occurred within the 4-hour peak travel period (2 morning hours plus 2 afternoon hours). Transbay trips constitute 48.6% of weekday travel with 24.6% Eastbay and 26.8% Westbay.

Weekends: Saturday ridership averaged 88,950 trips with 44.9% Transbay, 30.4% Eastbay, and 24.7% Westbay. Ridership for Sunday averaged 52,436 with market shares of 44.5% Transbay, 33.5% Eastbay, and 22.0% Westbay.

Total Ridership: Rail ridership totaled 60,457,004 trips in FY 1988/89, 1.8% above a forecast of 59,369,780.

CAPACITY

On-Line Requirements: BART currently operates a maximum of 45 on-line trains which require 90 A-cars, 248 B-cars, and 8 C-cars. In addition to these, 8 trains are held as ready spares requiring 16 A-cars and 24 B-cars.

Maximum Service Delivery: As of June 1989, scheduled peak hour capacity for the three Transbay routes serving downtown San Francisco and Oakland stations is 17 trains consisting of 159 cars (or 11,448 seats). For the Eastbay route, which also serves downtown Oakland stations, maximum peak hour capacity is 5 trains consisting of 24 cars (or 1,728 seats).

KEY PERFORMANCE INDICATORS

Train On-Time Performance: Daily on-time performance has consistently been above 90% since October 1980 and averaged 96.1% in FY 1988/89.

Scheduled Train Dispatches Completed: Performance has consistently been above 98% since January 1981 and averaged 99.1% in FY 1988/89.

Load Factors: Peak hour load factors during FY 1988/89 averaged 1.26 for Transbay service and 1.06 for the Eastbay route. Load factors for the shoulder period (approximately 45 minutes before and after the peak hour) averaged 1.17 Transbay and 0.93 for the Eastbay route. Maximum average load factors for offpeak service is 0.72 systemwide.

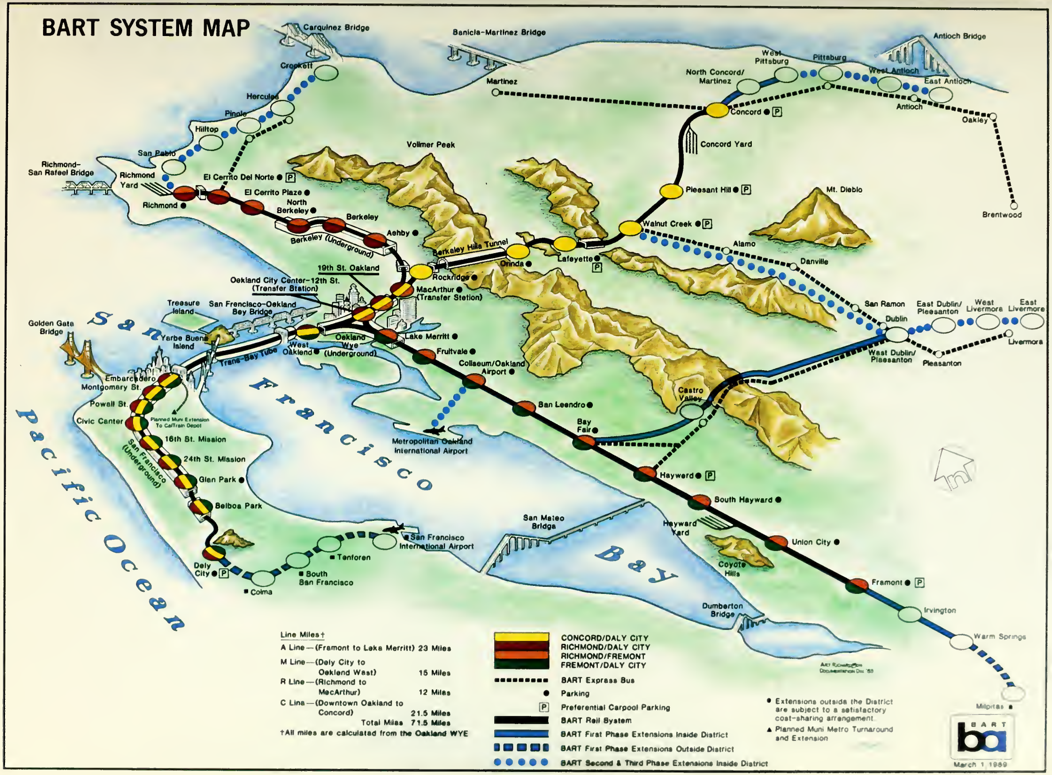
Peak Period Transbay Throughput: The percentage of scheduled Transbay capacity actually provided in FY 1988/89 is 98.0% for trains and 97.9% for cars.

OTHER PERFORMANCE DATA FOR FY 1988/89

PERFORMANCE DATA (1,000s)	
Total passengers	60,457.0
Passenger-miles	757,225.2
Car-miles	33,197.2
Car-hours	1,181.7
Rail operating cost	$157,586.3
Express bus cost	$6,906.3
Transfer/Shuttle bus cost	$7,723.6
Total operating cost	$172,216.2
Net passenger revenue	$83,192.0
Other revenue	$6,421.2
Total revenue	$89,613.2
Operating deficit	$82,603.0

PERFORMANCE INDICATORS	
Farebox ratio	48.31%
Operating ratio	52.04%
Passenger-miles/seat-mile	31.68%
Rail operating cost/passenger-mile	20.81¢
Rail operating cost/passenger	$2.61
Total operating cost/passenger	$2.85
Total operating revenue/passenger	$1.48
Total operating deficit/passenger	$1.37
Rail operating cost/car-hour	$133.36
Rail operating cost/car-mile	$4.75
Passenger-miles/car-hour	640.79
Passenger trips/car-mile	1.82

BART SYSTEM MAP



Line Miles†

A Line—(Fremont to Lake Merritt)	23 Miles
M Line—(Daly City to Oakland West)	15 Miles
R Line—(Richmond to MacArthur)	12 Miles
C Line—(Downtown Oakland to Concord)	21.5 Miles
Total Miles	71.5 Miles

†All miles are calculated from the Oakland WYE

BART

BAY AREA RAPID TRANSIT DISTRICT

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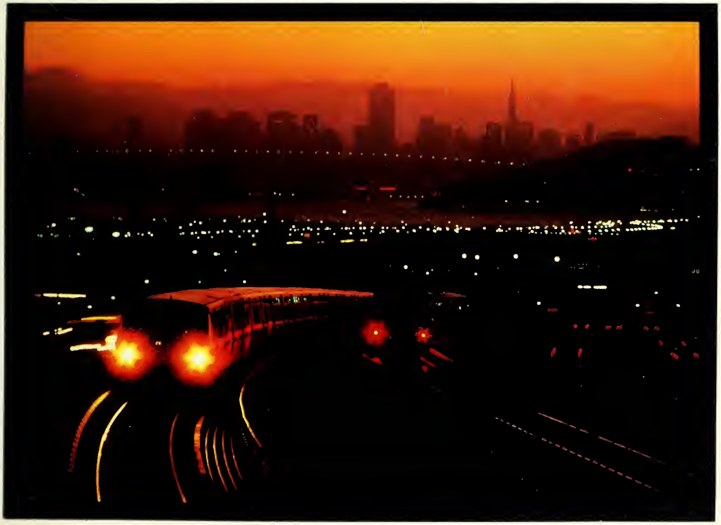
1989 FIVE YEAR PLAN SUMMARY



SEPTEMBER 1989

BART FACTS
FISCAL YEAR 1988/1989 DATA
(JULY 1988 - JUNE 1989)

FIXED FACILITIES

Mainline Track: Revenue service is provided over 71.5 miles of double mainline 66 inch guage track, of which approximately 20 miles are in subway, 24 elevated, and 27 at grade.

Stations: There are 34 stations including 14 in subway, 13 elevated, and 7 at grade. Average station spacing is between 1/2 to 1 mile within and adjacent to San Francisco, Oakland, and Berkeley downtown areas, and 2 to 4 miles apart in suburban areas. Automatic fare collection equipment is located in each station to vend and process patron tickets. As of June 1989, BART provides 26,592 free paved parking spaces at 23 stations and 200 paved spaces at one additional station at a daily charge of 25¢ per space.

Maintenance Facilities: Equipment maintenance is performed at three Eastbay yards located in Hayward, Concord, and Richmond. A special track geometric vehicle is used to analyze the running rails and electrical third rail. Maintenance of right-of-way is routinely performed during off-revenue hours.

Administrative/Central Control Center: Trains are automatically controlled by wayside equipment and supervised by the central computer at BART headquarters located above the Lake Merritt Station in Oakland. Operators on board the leading car of each train have full voice communication with central control personnel and passengers on board, and can override automatic controls should the need arise.

ROLLING STOCK

Fleet Inventory: BART owns three types of revenue vehicles. Control equipped A-cars contain 72 seats, are 75 feet long by 10.5 feet wide, and can only be used as a lead or trail vehicle on each train. Non-control equipped B-cars also contain 72 seats, are 70 feet by 10.5 feet, and can only be used as a mid-train vehicle. Control equipped C-cars contain 64 seats, are 70 feet by 10.5 feet, and can be used as a lead, mid-train, or trail vehicle. As of June 1989, BART owns 137 A-cars, 303 B-cars, and 90 C-cars. All of these vehicles are in the operating fleet except for two A-cars and two B-cars. One A-car is retained as an engineering test vehicle, one A-car and one B-car were removed due to accident damage, and one B-car is in long-term storage.

Trains: Train lengths range from 3 to 10 cars. Corresponding seating capacity is between 192 and 720 passengers. Scheduled top speed is 70 mph with a systemwide average of 33 mph, including station stops. Trains stop at each station along a designated route.

SERVICE HOURS

Rail: Rail service is provided between the hours of 5 am and 1:30 am Monday through Friday, 6 am to 1:30 am on Saturdays, and 9 am to 1:30 am on Sundays and major holidays. Closings for individual stations are timed with the schedule for the last train beginning at approximately midnight. Service frequencies (in minutes) for individual routes and line segments are as follows:

	TRANSBAY ROUTES			EASTBAY	CBD LINE SEGMENT	
	Concord-Daly City	Fremont-Daly City	Richmond-Daly City	Richmond-Fremont	San Francisco	Downtown Oakland
WEEKDAY						
Peak Hour	7.5	11	15	15	3.8**	3.8
Midday	15	15	15	15	5	5
Night	20	*	*	20	20	10
SATURDAY						
Daytime	20	20	20	20	6.7	6.7
Night	20	*	*	20	20	10
SUNDAY/HOLIDAY						
All Day	20	*	*	20	20	10

*Requires transfer between Concord/Daly City and Richmond/Fremont routes.
**3.0 minute headway service is operated during peak 15 minutes.

Express Bus: The District also provides express bus service within major travel corridors not served by rail in both Alameda and Contra Costa counties in the Eastbay. Bus service frequencies (in minutes) are as follows:

	Eastern Contra Costa	Western Contra Costa	Central Contra Costa-Alameda	Eastern Alameda
WEEKDAY				
Peak Hour	15	30	30	30
Midday	30	30	30	30
Night	60	40	60	60
SATURDAY				
Daytime	60	40	45	30
Night	60	40	60	60
SUNDAY/HOLIDAY				
All day	60	*	60	60

*No service during this time period.

(Continued on inside back cover)

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

SUMMARY

1989 FIVE YEAR PLAN

INTERIM UPDATE

The preparation of this report has been financed in part through a grant from the United States Department of Transportation, Urban Mass Transportation Administration under the Urban Mass Transportation Act of 1964, as amended, as passed through the Metropolitan Transportation Commission.

The contents of this report reflect the views of BART, which is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the original views or policy of the U.S. Department of Transportation. This report does not constitute a standard, specification, or regulation.

September 1989

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

BOARD OF DIRECTORS

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Nello Bianco
Vice President

Michael Bernick

Erlene DeMarcus

Joe Fitzpatrick

John Glenn

Sue Hone

Margaret K. Pryor

Wilfred T. Ussery

Frank J. Wilson
General Manager

Department of Planning, Budget and Research
Bay Area Rapid Transit District
800 Madison Street
Oakland, California 94607

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BART
BAY AREA RAPID TRANSIT DISTRICT
800 Madison Street - Lake Merritt Station
P.O. Box 12688
Oakland, CA 94604-2688
Telephone (415) 464-6000

August 23, 1989

TO BART PATRONS AND BAY AREA RESIDENTS:

The decade of the '80s has been witness to BART establishing a solid performance record, implementing projects needed for added capacity, and progressing towards realizing extensions of the system. The 1989 editions of the Five Year Plan and Capital Improvement Program cap a decade of achievements and chart a course of action for realizing additional progress well into the 1990s.

With the completion of the Daly City Turnback and Yard later this year and well over one-half of the new C-cars already delivered, BART is putting the final touches in place which will allow for the addition of more service. Peak period train frequency and capacity will be increased over a four-year period beginning this coming year with the addition of three new transbay trains. By September 1993 BART will provide service with 33% more cars to form 29% more trains which will operate at a peak frequency 53% higher than today. Supporting this will be improved access to stations, including better feeder bus service and more than 10,600 new parking spaces.

With construction for Capacity Expansion Program projects winding down and new service coming on line, BART will be entering a new era for extensions. The groundwork completed over the past decade, including resolution of key issues and a tax-supported local commitment to build, has pumped new life into realizing first phase extensions to Dublin, Warm Springs, West Pittsburg, and San Francisco International Airport. BART extensions are the next great challenge.

Framing this challenge is the overriding concern for continuing to provide safe, efficient, and economical transportation on a day-to-day basis for BART's growing ridership. This effort is guided by BART's goals and objectives which have been developed as part of the Five Year Plan. These policy statements effectively channel our efforts, enabling BART to deliver the best service possible. Figures A and B, which follow, summarize this policy. These include new and ongoing projects and programs, as well as standards for operating performance. Figures C through H present key highlights of the 1989 Five Year Plan and Capital Improvement Program.

Frank J. Wilson
General Manager

ARLO HALE SMITH
PRESIDENT

NELLO BIANCO
VICE-PRESIDENT

FRANK J. WILSON
GENERAL MANAGER

DIRECTORS

JOE FITZPATRICK
1ST DISTRICT

NELLO BIANCO
2ND DISTRICT

SUE HONE
3RD DISTRICT

MARGARET K. PRYOR
4TH DISTRICT

ERLENE DeMARCUS
5TH DISTRICT

JOHN GLENN
6TH DISTRICT

WILFRED T. USSERY
7TH DISTRICT

ARLO HALE SMITH
8TH DISTRICT

MICHAEL BERNICK
9TH DISTRICT

Figure A: FY 1989/90 BART POLICY FRAMEWORK, GOALS AND PROGRAM OBJECTIVES

Figure A: **FY 1989/90 BART POLICY FRAMEWORK, GOALS AND PROGRAM OBJECTIVES**

GOALS	PROGRAM OBJECTIVES
1. Operate scheduled 4-route weekday service with route headways of 15 minutes or less during peak and midday periods; expand service within technical and financial limits, including improved peak-hour frequency of service and capacity where needed. 2. Improve the reliability and performance of the present BART system. 3. Fund and implement the necessary capital improvements and replacements to the system. 4. Operate within available funds without incurring an unfunded deficit. 5. Continue to improve BART system and patron safety and emergency preparedness. 6. Improve system access by means of a comprehensive program of parking expansion, feeder services, transit coordination, and special projects addressing elderly and handicapped mobility. 7. Develop and maintain a BART workforce that is motivated to provide the best service possible to BART passengers. 8. Make every effort to achieve District objectives for female and minority employment, and disadvantaged and minority business enterprise participation.	**CAPACITY & RELIABILITY** 1. Continue to implement the Capacity Expansion Program and projects which will allow for the startup of 51-train service at a minimum scheduled headway of 3 minutes 10 seconds by November 1989. **SAFETY** 2. Conduct a minimum of one emergency plan exercise per month involving response agencies. 3. Implement the Comprehensive Mitigation Plan addressing BART industrial injuries. **ACCESS** 4. Provide 443 additional BART-owned paved parking spaces at existing rail stations by June 1990. 5. Implement the Universal Ticket Demonstration Project such that prototype testing is completed by June 1990 for the bus ticket validator, credit/debit card equipment, and cubic faregate modifications. 6. Adopt a multi-year master plan for elderly and handicapped facility improvements and begin implementation of feasible items by June 1990. **HUMAN RESOURCES** 7. Implement a Districtwide customer service philosophy and assure that departmental objectives and management practices support it. 8. Work to achieve the objectives called for in the Affirmative Action Plan and report performance semi-annually and DBE/MBE quarterly.
9. Increase system utilization by promoting BART travel for all purposes with special emphasis on offpeak and reverse commute trips. 10. Maximize the contribution to operating costs from passenger revenues, consistent with reasonable fare levels, to achieve a farebox ratio above 50%. 11. Develop station area sites for the realization of increased patronage and revenues, and to enhance the communities BART serves.	**MARKETING** 9. Complete installation of platform train schedule panels at all stations by September 1989. 10. Complete the 1990 Passenger Profile Survey to provide updated marketing information. 11. Through District marketing efforts, attract 1.5% more riders than the budget ridership forecast. 12. Reach and maintain 150 offsite ticket outlets at banks and retail establishments available to the general public, in addition to the employer distribution program, with adequate coverage throughout the District. **CONCESSIONS & PROPERTY MANAGEMENT** 13. Execute a concession permit with Host International by August 1989 for the establishment of gift and sundry shops at five BART stations.
12. Extend BART trunk lines within Bay Area travel corridors where feasible and in support of regional land use policies.	**EXTENSIONS** 14. Complete the Warm Springs Extension Environmental Impact Report by January 1990. 15. Complete the Dublin/Pleasanton Extension Environmental Impact Report and preliminary engineering by January 1990. 16. Obtain initial earmarking of federal funds for the Rail Extension Program by October 1, 1989. 17. Complete preliminary engineering for a Colma Station extension by April 1990. 18. Maintain a schedule for the Pittsburg Extension such that preliminary engineering will be complete by September 1990.

Figure B

BART POLICY FRAMEWORK
FY 1989/90 PERFORMANCE INDICATORS AND STANDARDS*

SERVICE DEMAND

**1. Achieve ridership projections as follows (in 1,000s):

	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	FY 1989/90
TOTAL TRIPS	15,543	15,543	15,346	15,943	62,375
AVERAGE WEEKDAY	213.2	213.8	213.4	217.3	215.4

SERVICE DELIVERY

2. Make available for revenue service by 4 a.m. 85% of A-cars, 90% of B-cars, and 75% of C-cars (less 20 cars for testing, retrofit, parts, etc.) until the inverter problem is resolved.

3. Provide service such that no more than 3% of peak period trains experience a primary delay exceeding 5 minutes and no more than 8% experience a delay from any cause exceeding 5 minutes.

4. Operate weekday peak period transbay service in the peak direction providing at least 97.5% of scheduled **CAR THROUGHPUT.**

5. Provide capacity where possible such that the maximum average load factor for discretionary trains is 1.15 during peak periods and not more than 1.00 in the offpeak.

6. Conduct operations such that 94.0% of all **PATRON TRIPS** are completed **ON-TIME.** Also report weekday peak period performance.

7. Continue to provide an environment for patron circulation within stations and in trains such that the accident rate does not exceed 17.7 per million passenger trips.

8. Maintain the **AFC INCIDENT RATE** at or below 0.30 incidents per 1,000 passenger trips.

9. Maintain 97.0% availability for elevators and escalators.

10. Maintain express bus on-time performance such that 95.0% of all runs arrive at their final destination within 5 minutes of schedule.

PRODUCTIVITY & EFFICIENCY

11. Achieve a **FAREBOX RATIO no less than 51.9% for **RAIL OPERATIONS,** 11.7% for express bus operations, and 48.0% for systemwide operations.

12. Achieve a **SYSTEM OPERATING RATIO of no less than 51.2%.

13. Achieve a **RAIL COST PER PASSENGER MILE of 21.0¢ or less.

**14. Achieve a level of service output such that 16,240 vehicle miles are produced per equivalent District employee (based on 2,000 hours worked including overtime, and excluding capitalized and reimburseable labor hours).

**15. Improve system utilization (passenger miles per seat mile) to 31.4% through continued monitoring of train capacity to match passenger demand patterns and attracting reverse commuters.

16. Reduce the total annual amount of employee lost time due to industrial injuries as a percent of time worked to 0.50% or less.

17. Maintain a paid sick leave rate of no more than 3.50%.

18. Work to obtain 21% disadvantaged business enterprise participation for all District contracts determined to have DBE opportunities, including 21% DBE participation for all Federally assisted contracts awarded during the year.

* **KEY INDICATORS** are denoted by bold face capital letters.

** These standards are derived from the adopted FY 1989/90 budget.

Figure C

1989 BART FIVE YEAR PLAN OPERATING PARAMETERS AND FORECASTS

	BUDGETED	FORECAST			
	FY 1989/90	FY 1990/91	FY 1991/92	FY 1992/93	FY 1993/94
SERVICE DEMAND					
Total Passenger Trips (1,000s)	62,025	64,067	65,415	67,250	68,634
Average Weekday Trips (1,000s)	214	221	225	232	236
Passenger Miles (1,000s)	779,126	804,782	821,711	844,764	862,152
SERVICE DELIVERY					
*Minimum Scheduled Headway (min:sec)	3:10	2:15	2:15	2:15	2:15
*Peak Period Trains Online	51	55	55	58	58
*Peak Period Cars Online	400	433	452	460	460
Car Hours (1,000s)	1,318	1,216	1,214	1,247	1,269
Car Miles (1,000s)	34,694	34,012	34,655	35,587	36,228
**Parking Space Inventory	27,225	N.A.	N.A.	N.A.	36,715
PRODUCTIVITY & EFFICIENCY					
Total Operating Expense (1,000s)	$179,684	$188,582	$199,271	$211,039	$233,631
***Equivalent Operating Staff	2,372	2,399	2,413	2,423	2,436
System Operating Ratio	51.2%	50.3%	51.1%	51.1%	49.3%
Rail Farebox Ratio	51.9%	51.0%	51.6%	51.5%	49.7%
Rail Cost Per Passenger Mile	21.0¢	21.4¢	22.2¢	22.9¢	24.9¢

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*Maximum service level programmed during respective fiscal years.
**Number of parking spaces at rail stations; does not include express bus park-ride lots.
***Excludes captialized and other reimbursable positions. Staffing as of June each fiscal year.

Figure D

BART CAPACITY EXPANSION PROGRAM
STATUS AS OF MARCH 1989
Target Dates May Be Altered By Changes In Project Completion Schedules

04/12/89

Minimum Headway Capability (Min:Sec)	Projects Required To Achieve or Support This Headway	Anticipated Project Completion Dates	Target Expanded Service Start Dates	Peak Hour Trains Peak Direction Transbay	Peak Period Capacity Trains		On-Line Cars	Spare Cars	Total Cars Required	Available Fleet (Extra)	Fleet Accepted by Engineering	
3:45	Current Service	---	Nov 86	17	45	A C B T	90 8 248 346	14 2 24 40	104 10 272 386	114 (+10) 10 272 396 (+10)	136 48 303 487	A C B T
	47 C-Cars Available for Operations	Jul 89				A C B T	96 42 243 381	14 2 24 40	110 44 267 421	114 (+4) 44 272 (+5) 431 (+9)	136 83 303 522	A C B T
	Daly City Turnback	Jul 89	Aug 89	17	48							
3:10	58 C-Cars Available for Operations	Oct 89	Nov 89	19	51	A C B T	100 52 248 400	14 6 24 44	114 58 272 444	114 58 272 444	136 98 303 537	A C B T
2:30	New On-Board ATC (A-Car Retrofit)	Jul 89										
	Daly City Yard	Sep 89										
	M-87 Interlocking	Nov 89										
	Wayside Train Control/System Performance Mods	Jun 90										
	Electrical Capacity Increase: - Procure/Install Substation	Sep 90										
	101 C-Cars Available for Operations	Sep 90	Oct 90	23	52	A C B T	100 91 232 423	14 10 30 54	114 101 262 477	114 101 272 (+10) 487 (+10)	136 150 303 589	A C B T
2:15	Brake Rate Algorithm Modifications	Mar 91										
	104 C-Cars Available for Operations	Mar 91	Apr 91	26	55	A C B T	100 94 239 433	14 10 30 54	114 104 269 487	114 104 272 (+3) 490 (+3)	136 150 303 589	A C B T
	ICS	May 90				A C B T	100 110 242 452	14 10 30 54	114 120 272 506	114 120 272 506	136 150 303 589	A C B T
	120 C-Cars Available for Operations	Sep 92	Oct 92	26	58							
	128 C-Cars Available for Operations	Jul 93	Sep 93	26	58	A C B T	100 118 242 460	14 10 30 54	114 128 272 514	114 128 272 514	136 150 303 589	A C B T

Figure E

OPERATING BUDGET USES

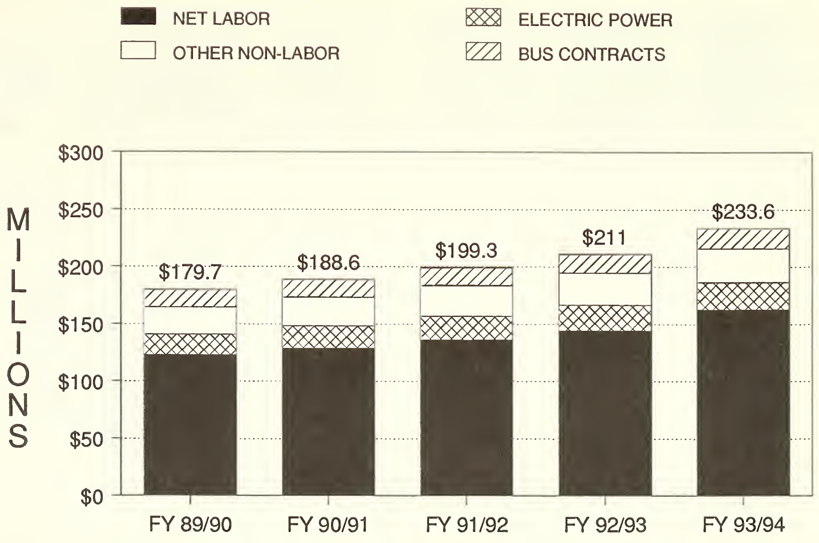
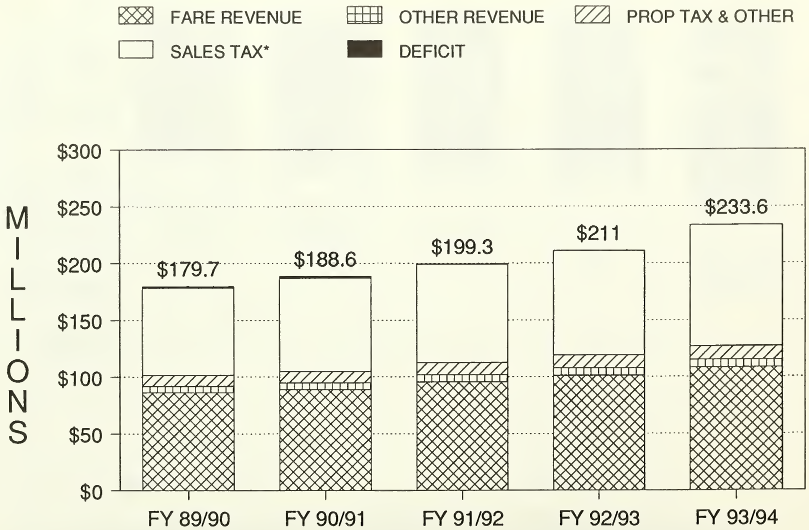


Figure F

OPERATING BUDGET SOURCES



* Net of capital and other allocations.

Figure G

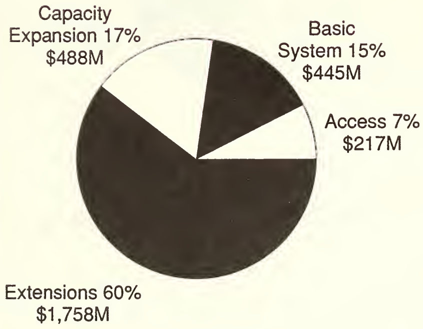
BART CAPITAL PROGRAM

$2,908 MILLION

Current Dollars Except for Extensions in 1987 Dollars

FUNDING USES

(PROPOSED)



* Funds available for expenditure.
** Funds commited by outside source.
*** Funds not available for expenditure.

FUNDING SOURCES

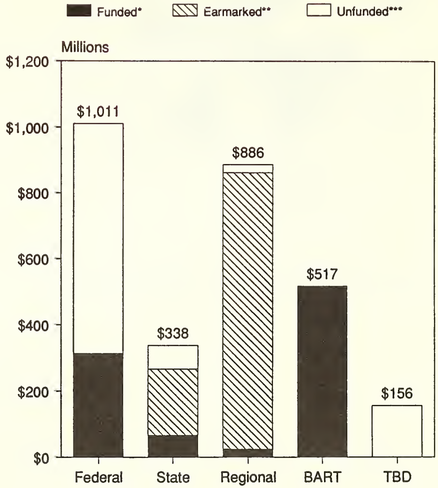


Figure H

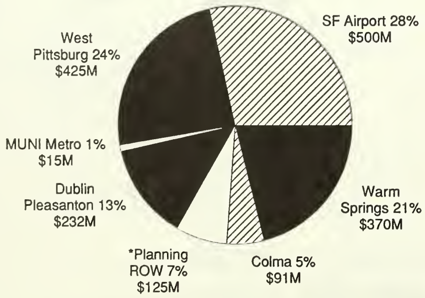
BART EXTENSIONS PROGRAM

$1,758 MILLION

In 1987 Dollars

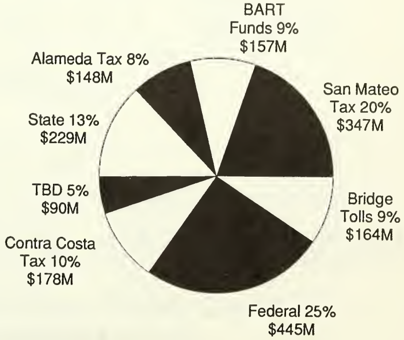
FUNDING USES

(PROPOSED)



*Phase II, including contingencies

FUNDING SOURCES**



** Funded, earmarked, and unfunded sources.
See Figure G for definitions.

CREDITS

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(Continued from inside front cover)

BART FACTS
FISCAL YEAR 1988/1989 DATA
(JULY 1988 - JUNE 1989)

FARES

Regular Adult: Rail fares are largely based on a distance formula ranging from 80¢ to $3.00. The face value for the average BART trip in FY 1988/89 was $1.55, including all MUNI Fast Pass trips at full value (80¢). The actual net average fare paid was $1.38, reflecting an 11% discount for the rail system. Regular express bus fares are 75¢ and $1.15 for one and two zone rides, respectively; rail patrons transferring to an express bus may obtain a free transfer worth 75¢.

Discounts: A maximum 6.25% rail fare discount is provided through the sale of $32 tickets for $30. Rail fares for handicapped persons, students 5-12 years of age, and persons 65 years of age and older are 10% of the regular adult fares. Children under 5 can ride free. Other discounts are provided through specially priced passes and/or ticket books for travel on BART express buses, San Francisco MUNI, and AC Transit.

Transfers: Free transfers can be made between all BART trains. Special agreements between BART and most other Bay Area operators permit up to a 50% discount for connecting transit service (on a round-trip basis).

PATRONAGE

Average Weekday: BART patronage averaged 207,231 trips per weekday in FY 1988/89. Of these trips, 101,319 (48.9%) occurred within the 4-hour peak travel period (2 morning hours plus 2 afternoon hours). Transbay trips constitute 48.6% of weekday travel with 24.6% Eastbay and 26.8% Westbay.

Weekends: Saturday ridership averaged 88,950 trips with 44.9% Transbay, 30.4% Eastbay, and 24.7% Westbay. Ridership for Sunday averaged 52,436 with market shares of 44.5% Transbay, 33.5% Eastbay, and 22.0% Westbay.

Total Ridership: Rail ridership totaled 60,457,004 trips in FY 1988/89, 1.8% above a forecast of 59,369,780.

CAPACITY

On-Line Requirements: BART currently operates a maximum of 45 on-line trains which require 90 A-cars, 248 B-cars, and 8 C-cars. In addition to these, 8 trains are held as ready spares requiring 16 A-cars and 24 B-cars.

Maximum Service Delivery: As of June 1989, scheduled peak hour capacity for the three Transbay routes serving downtown San Francisco and Oakland stations is 17 trains consisting of 159 cars (or 11,448 seats). For the Eastbay route, which also serves downtown Oakland stations, maximum peak hour capacity is 5 trains consisting of 24 cars (or 1,728 seats).

KEY PERFORMANCE INDICATORS

Train On-Time Performance: Daily on-time performance has consistently been above 90% since October 1980 and averaged 96.1% in FY 1988/89.

Scheduled Train Dispatches Completed: Performance has consistently been above 98% since January 1981 and averaged 99.1% in FY 1988/89.

Load Factors: Peak hour load factors during FY 1988/89 averaged 1.26 for Transbay service and 1.06 for the Eastbay route. Load factors for the shoulder period (approximately 45 minutes before and after the peak hour) averaged 1.17 Transbay and 0.93 for the Eastbay route. Maximum average load factors for offpeak service is 0.72 systemwide.

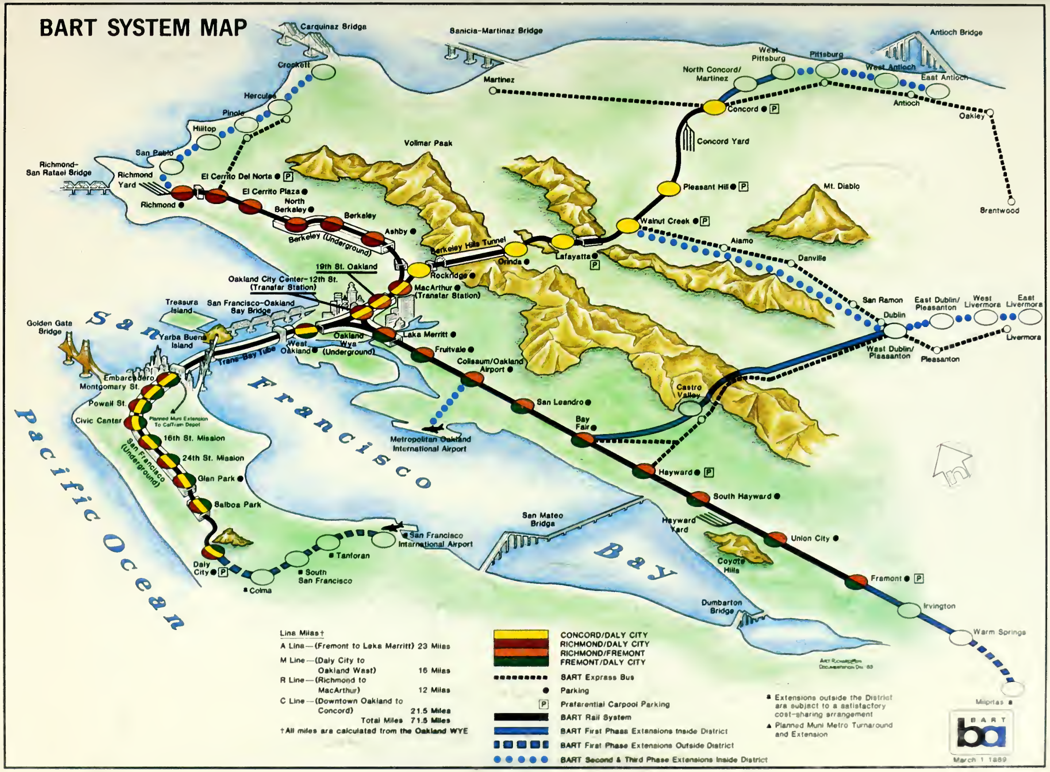
Peak Period Transbay Throughput: The percentage of scheduled Transbay capacity actually provided in FY 1988/89 is 98.0% for trains and 97.9% for cars.

OTHER PERFORMANCE DATA FOR FY 1988/89

PERFORMANCE DATA (1,000s)	
Total passengers	60,457.0
Passenger-miles	757,225.2
Car-miles	33,197.2
Car-hours	1,181.7
Rail operating cost	$157,586.3
Express bus cost	$6,906.3
Transfer/Shuttle bus cost	$7,723.6
Total operating cost	$172,216.2
Net passenger revenue	$83,192.0
Other revenue	$6,421.2
Total revenue	$89,613.2
Operating deficit	$82,603.0

PERFORMANCE INDICATORS	
Farebox ratio	48.31%
Operating ratio	52.04%
Passenger-miles/seat-mile	31.68%
Rail operating cost/passenger-mile	20.81¢
Rail operating cost/passenger	$2.61
Total operating cost/passenger	$2.85
Total operating revenue/passenger	$1.48
Total operating deficit/passenger	$1.37
Rail operating cost/car-hour	$133.36
Rail operating cost/car-mile	$4.75
Passenger-miles/car-hour	640.79
Passenger trips/car-mile	1.82

BART SYSTEM MAP



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